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# THE CONDOR

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Ornithology

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# THE CONDOR

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## CONTENTS

Nesting Habits of the Leucosticte (with six ill.).....	Ruth Wheeler	133
The Molt of House Finches of the Pasadena Region, California (with one chart) .....	Harold Michener and Josephine R. Michener	140
A New Pleistocene Turkey from Mexico (with two ill.).....	Loye Miller	154
Variation in the American Goshawk.....	P. A. Taverner	157
A Transition Island in the Mohave Desert.....	Alden H. Miller	161
FROM FIELD AND STUDY		
Varied Thrush Trapped by Acorn (with one ill.).....	David Gelston Nichols	164
The Arctic Tern at Portland and Diamond Lake, Oregon.....	Stanley G. Jewett	164
Food Habits of Horned Owls in the Pahrangat Valley, Nevada.....	R. M. Bond	164
An "Eagle Guard" Developed in Idaho (with one ill.).....	William H. Marshall	166
Siberian Peregrine Falcon in North America (with two ill.).....	Wilson C. Hanna	166
Bush-tit Nesting in Vicinity of Marshes.....	J. Duncan Graham	168
Food Habits of the White-tailed Kite.....	R. M. Bond	168
Food of the Sharp-shinned Hawk.....	J. A. Munro	168
The House Finch in Western Oregon.....	Stanley G. Jewett	169
New and Noteworthy Records of Birds for the State of Nevada.....	J. R. Alcorn	169
Wood Ducks in Solano and Napa Counties, California.....	Emerson A. Stoner	170
Eared Grebe at Yakutat, Alaska—A Correction.....	T. M. Shortt	170
NOTES AND NEWS.....		171
MINUTES OF COOPER CLUB MEETINGS.....		171
OFFICERS AND MEMBERS OF THE COOPER ORNITHOLOGICAL CLUB.....		173







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# THE CONDOR

VOLUME XLII

MAY-JUNE, 1940

NUMBER 3

## NESTING HABITS OF THE LEUCOSTICTE

WITH SIX ILLUSTRATIONS

By RUTH WHEELER

In 1919, W. L. Dawson spent many days in the Sierras in the vicinity of Mammoth Pass, California, hunting nests and collecting sets of eggs of the Sierra Nevada Rosy Finch (*Leucosticte tephrocotis dawsoni*). All but one of the several nests which he records finding (Birds of California, 1923, pp. 162-175) were in wells and crevices on the cliffs, most of which were reached after great effort, attended by considerable danger to life and limb. This led Mr. Dawson to believe that leucostictes nest most frequently on the cliffs. Grinnell and Storer (Animal Life in the Yosemite, 1924, p. 433) make mention of not having found any nests during their studies in the Yosemite region, having "considerately left this accomplishment for someone with marked cliff-climbing predilections. . . ."

Mr. Wheeler and I are not cliff-climbers, but we were anxious to make a study of the leucosticte. With this purpose in view we camped in Tuolumne Meadows, Yosemite National Park, in the spring of 1939. On the 29th of June, near Saddlebag Lake in Mono County, we saw a leucosticte fly up over the rock-covered slope toward the foot of a cliff. It was carrying a tuft of white material in its bill. We labored up the rock-slide in the general direction the bird had taken. When we had reached a point nearly a half-mile up the slope, a number of rosy finches were observed flying from point to point on the cliffs and large boulders. Here we took a position for more careful observation. After waiting a considerable time, a bird was again seen carrying something white in its bill, but quickly disappeared over a slight ridge of rock. We crossed over this and stepped quietly from rock to rock until near the place where the bird disappeared. Just a few feet farther down the slope, the bird flew up and away across the rock-slide.

Careful search revealed nothing, so we crossed a small snowfield to a little elevation overlooking the area. About twenty minutes later the finch returned, and through our glasses we saw it disappear under a flat rock, the location of which we carefully noted (fig. 37). Quickly we recrossed the snowfield, crouched behind a large boulder about twenty feet from where the bird was last seen, and waited. Presently the leucosticte flew out, but without the tuft of white. As soon as she had gone, I carefully reached back through the narrow space between the rocks. Not more than twelve inches from the opening, but out of sight, my fingers touched the nest. The nest was empty and the lining which was made of the seeds from willow catkins was still damp and fresh. While we were near the nest the pair of leucostictes came and flew about, uttering plaintive cries of distress. After a short time, they flew away and did not return during the half hour we were near the nest.

On July 9 we returned to the nest, anxious to see if a set of eggs had been laid. We feared that the birds, disturbed by our previous visit, might have deserted. After the

long climb up the rock slope we were greatly cheered to see a bird flying up toward the location. When we reached the site of the nest we set up our cameras and prepared to take pictures. Only the female was near the nest. Each time she came, she flew about, alighting here and there close by, before she entered the crevice to brood her eggs for



Fig. 37. Nesting site of Sierra Nevada Rosy Finch, near Saddlebag Lake, Mono County, California. Nest situated under large flat rock in center foreground. The bird entered through the triangular opening.

Photos by H. D. Wheeler and Ruth Wheeler.

a few minutes. In an effort to keep her in front of the camera a moment, I held my hand over the opening to the nest. The bird flew close and finally brushed against my hand while trying to push her way to the nest.

She seemed to find her way with such accuracy to the nest hidden in this vast waste that we decided to test her sense of location. While she was away, we set up a slab of rock near the rock that covered her nest. When she returned, she looked about in bewilderment, uttering perplexed cries and peering under every rock near by and into the crevices between the rocks. It was not until we removed the slab that she found her nest again.

In order to photograph the nest in location and thus add to the knowledge of the habits of these elusive birds, we removed the flat rock which covered the nest. Four pure white eggs lay on the smooth lining (fig. 38). Although entirely white, the shell was almost translucent in places, causing it to have a faint pinkish tinge. The crevice between the rocks, in which the nest was placed, was filled with trash until it was level



Fig. 38. Nest and eggs at site shown in figure 37; July 9, 1939.

with the opening, not as a wren fills a nesting hole with a rough pile of sticks, but packed down and smooth like a floor. Bits of pine buds and tips of needles were woven in with tiny sticks and small pieces of vegetation. The nest, which was sunken into the middle of this floor, was made of coarse grass, and then lined with fine grass like the pikas gather and pile into their little haycocks to dry between the rocks. Last of all was an inner lining of the soft willow fluff that we had seen the bird bringing on our previous visit. A tan feather which we did not identify was stuck into the edge as a finishing touch.

To the south of Ellery Lake in Mono County, a great cirque of granite rocks rises and snow lies all summer in patches near the base of the cliff. Down from this cliff stretches a long rock slide which ends in the water of the lake. Leucostictes had been seen feeding near the lake at dusk, and this region to the south appeared to be a good location for study. On July 6, 1939, we climbed the rock slide and located a nest under

a rock up near the edge of the snow field. The five young birds were quite large and made their presence known by squealing loudly when they were fed. This nest was placed on a bed of sandy gravel which had evidently been deposited between the rocks as the snow receded in the spring. Both parents were feeding the young, flying up from



Fig. 39. Cirque near Ellery Lake, Mono County. Locations of three leucosticte nests are marked by black dots, one in large boulders (shown in fig. 41), one on ridge of rock slope, and one in cliffs to right.

the meadow far below with labored flight. Although they rested frequently on the upward journey they made the trip back down to the meadow in a long swooping flight.

While observing this family, we heard the distant squeal of baby birds being fed. We located the sound as coming from high up on the cliff where we saw birds fly frequently to the upper end of a long chimney. We decided, after some observation, that a nest must be located in this crevice with nearly grown young in it. The spot was well chosen and was apparently inaccessible from either above or below.

In the course of several trips we made up the mountain south of Ellery Lake, we observed a leucosticte fly over a distant ridge of great rocks and disappear. We determined to find a nest in that region if possible, as that habitat, consisting of great boulders loosely thrown together, was different from either of the formations where the previous nests had been found.

When we reached the large rock which had been our land-mark as we crossed the steep slope, we waited until a leucosticte came flying up the mountain. The bird flew past us and disappeared among the huge boulders. Here the problem was more difficult than finding a nest in the smaller rocks, for the great pieces of granite leaned upon each

other at all angles and small caverns led back under the precariously tilted rocks. As we climbed about, a rock settled against another with a grating sound and almost instantly a bird flew out of an opening under a great stone which lay in a horizontal plane upheld by other rocks. My husband squeezed through the small opening from which the bird had flown and slid down into a cave. When his eyes became accustomed



Fig. 40. Adult rosy finch near nest.

to the dim light, he saw, on a long ledge formed by the upper surface of one of the boulders, the nest of the leucosticte. Five tiny birds huddled together in the low flat nest. The cave which was the home of this family was about twelve feet wide and twenty feet long. The floor was very rough, being composed of boulders, some of which reached to the ceiling. One rock about seven feet thick served as the covering of the cave. Having located the nest, my husband remained perfectly still. Presently the female came in, went directly to the nest and began to feed the little birds (fig. 41). The male finch came in at that moment and stood quietly by while she continued feeding. Then he took his turn and fed each youngster.

After the birds had left, I entered the cave and waited. Finally I heard the faint scratching of the feet of the finch as she entered the cave. I turned my head toward where she was hopping along the ledge near the opening, but she flew away, greatly startled. In a few moments she came again but took fright when I turned only my eyes to look at her. The difficulty seemed to be that the bird had to pass within about four feet of me before she could reach her nest. The third time I heard her alight on

the rock at the entrance to the cave I closed my eyes. I sat motionless as I heard her feet patter across the rock. After a few moments all was quiet. When I opened my eyes, she was sitting on her nest with her eyes fixed on me (fig. 42). Although extremely nervous, she brooded her young for several minutes before she slipped off the nest and left the cave.

We spent nearly three hours watching these finches during the afternoon. It was very cold, as a chilling draft blew from back under the rocks in the dark recesses of the cavern. Ice stood in the depressions of the floor. We made careful observation of the movements of the birds and found that it was about 45 minutes between the visits of the parents to the nest. They came together only the first time, each coming separately thereafter. We felt that their coming together was merely a coincidence. Each

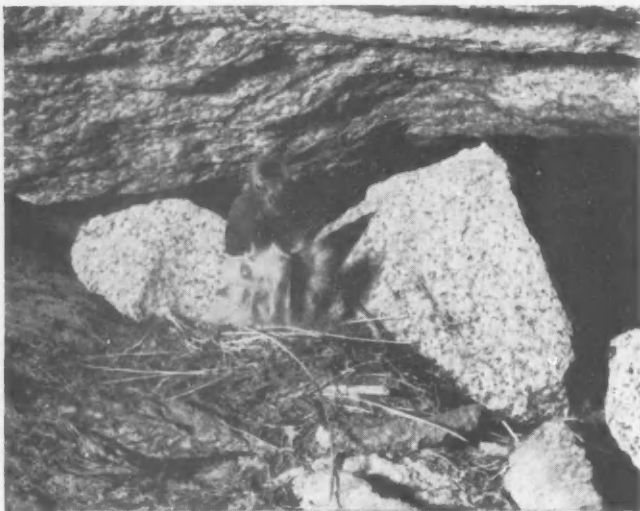


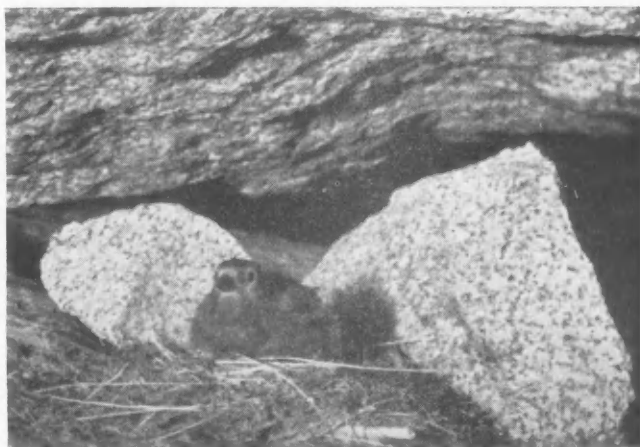
Fig. 41. The parent entered the cave and fed the five young birds; nest near Ellery Lake.

parent arrived at the nest with its throat distended with food, carrying enough to feed each of the five young, sometimes going around the circle again and feeding each baby twice. After feeding, the male hesitated only a moment and then flew away, while the mother slipped on to the nest and brooded the young birds for a few minutes.

Once when the mother came, she crept on to the nest at once and began to hover the young birds without feeding them. She may have done this because she was distressed by our presence. But the young birds were hungry and they began to lift their heads and cry for food. With outstretched necks they lifted her off the nest and pushed her aside. With a timid glance at us she began to satisfy their hunger.

We returned the next day and spent several hours more in the cave. The birds came at about the same intervals as during the previous afternoon. We took several photographs as they fed their young. They did not seem to be as shy as they were the day

before. The last picture we took was of the mother sitting on the nest brooding the young. After taking the pictures we crept very slowly and cautiously from the cave while she remained on the nest.



On the 30th of July, we returned through Tioga Pass again and camped at Ellery Lake long enough to climb the long rock slide to the cave where the rosy finches nested. We found the nest empty. On the whole mountainside, only two or three leucostictes could be seen.

*Angwin, California, January 10, 1940.*



THE MOLT OF HOUSE FINCHES OF THE PASADENA REGION,  
CALIFORNIA

WITH ONE CHART

By HAROLD MICHENER and JOSEPHINE R. MICHENER

Dwight (1900) describes the molts of many passerine birds and states the general pattern followed by these birds. However, for anyone with an abundance of material, Dwight's reports of variations between species and between individuals of the same species are sufficient to stir the curiosity and the desire to verify and to extend his findings. He worked with many individuals, mostly skins, each of which he observed at only one stage of molt.

Mr. and Mrs. McCabe (1928), utilizing their banded Pine Siskins (*Spinus pinus*) with practically no repeats, relate the molting of the wing coverts, secondaries, and rectrices to that of the primaries without any reference to calendar time. Magee (1930 and 1936), with banded Purple Finches (*Carpodacus p. purpureus*), has based his studies on the progress of the molt in individual birds as they have repeated in his traps during the molting season. Miller (1928), working with 377 skins of the Loggerhead Shrike (*Lanius ludovicianus*), has given the progress of the molt in the various feather tracts and has related this progress in other tracts to that of the primaries.

Miller (1933), working with 247 skins of the Phainopepla (*Phainopepla nitens*), 175 of which were males and 43 of these first-year males collected subsequent to the postjuvinal molt, found that the postjuvinal plumages of male Phainopeplas are often complex, consisting of varied combinations of juvenal feathers and postjuvinal feathers having varying amounts of black pigmentation. He gives evidence supporting his conclusion that the extent of the retention of juvenal feathers and lack of melanin in the postjuvinal feathers are inversely proportional to length of time available for the postjuvinal molt and to the age, vigor and gonadal development of the bird at the time of this molt. In many respects our findings with the House Finches parallel closely his findings with the Phainopeplas, although geographic variation must be eliminated as one of the causative factors in our case.

The present study on the molt of the House Finch (*Carpodacus mexicanus grinnelli*) parallels that of Magee in the use of banded birds, many of which were recaptured frequently. Its object was to obtain an understanding of the autumnal, and only, molt of this bird. It was carried out by observations over a period of four years on the birds handled in the banding operations of a station banding from 2000 to 2500 House Finches per year and having many times that many repeat captures. House Finches lend themselves well to such a study because they are excellent repeaters.

In this work the primaries are numbered with no. 1 as the proximal primary, and the secondaries, including the three proximal ones sometimes called the tertiaries, are numbered from 1 to 9 beginning with the most distal. This is a change from our previous system (Michener and Michener, 1938) in which we followed Dwight and others in the numbering of the primaries. Study of the papers of Boulton (1927), Burt (1929), and Miller (1928) has led to the use of the present method.

We disclaim any effort to establish new names for the feathers of any regions on the bird, but where we have felt the need of naming them we have done the best we could with the works on pterylography at hand which, we have felt, lack completeness and agreement in regard to some of the smaller regions.



Some bilateral unbalance between the molting wings or the two halves of the tail has been found, but birds showing this to a marked degree have not been used, particularly ones that seem to indicate extreme departures from the usual order of molt, because of the danger that the unbalance resulted from fortuitous loss of feathers.

We do not assume to say that the findings for our House Finches at Pasadena, California, would hold true for House Finches throughout the range of the species. On the contrary we are inclined to the belief that in some respects they would not. For this reason the scope of this paper is limited to the House Finches of the Pasadena region.

#### THE MOLT OF ADULTS

Although the molt of the adult House Finch follows a quite definite general order of dropping and replacing feathers within each tract and in the tracts relative to each other, observations made on many birds reveal numerous deviations from this order. In fact, the variations are so numerous and so great that any statement of the "usual" sequence of the molt should be made and received with the understanding that it might not fit exactly any particular bird. Nevertheless, there is a "usual" sequence. The difficulty is in making a statement that is sufficiently elastic and yet one that will not give the impression that there is no order.

*Duration of the molt.*—The molt was studied in all adult House Finches captured from May 1 to late November. With slight exceptions, the first and last indications of the molt were found to be the dropping of primary 1 and the completion of the growth of secondary 6, respectively. The time between these two events, then, is considered the duration of the molt, and to determine the length of this interval the records of a great many birds have been used as follows:

1. Where almost the entire molt histories of the individuals are available, they were either used as they stand, or they were pieced out at one or both ends by using the information previously obtained in regard to the rate of growth of remiges (Michener and Michener, 1938).

2. Where a bird that had been watched from the beginning of its molt ceased coming, its record was superimposed on the record of a bird which first came after the molt had begun and which was watched until its molt was completed, provided the two records contained corresponding points in the molt at which they could be joined. This method is not to be regarded as completely reliable but was used merely to give additional evidence.

By these methods we have concluded that the molt of adult House Finches lasts about three and one-half months (105 days), and that it may vary between 90 and 120 days. A few typical records, giving the first and last entries only, are:

35-14875, female, June 26, 1937, primary 1 gone. October 18, secondaries 5 and 6 still short. This is an observed time of 114 days to which a few days should be added for the completion of the secondaries. This is the bird that led to the conclusion that the duration of the molt may be as much as 120 days. An observation on October 27 showed the molt to have been completed. Thus it is known that the molt duration was not more than 123 days for this bird.

B-8171, male, July 28, 1937, primary 1 gone on each side. October 26, primary 9 and secondaries 5 and 6 still a trace short. This is an observed period of 90 days. A few days must be added for the completion of the growth of these feathers.

36-30697, male, July 24, 1937, primary 1 a quill. October 16, molt completed. This is an observed time of 84 days. The molt began a few days before the first date and may have been completed a few days before the last date. This is the bird that led to the conclusion that the molt may extend over as little as 90 days.

Additional evidence of the approximate duration of the molt is given by the dates of the earliest and the latest observed beginnings and endings of the molt, as follows:

Earliest date of observed beginning of molt (a female), May 15; earliest date of observed completion of molt (a male), September 20, a time difference of 128 days.

Latest date of observation detecting molt not begun (a female), August 11; latest date of observed completion of molt (a female), November 10, a time difference of 91 days.

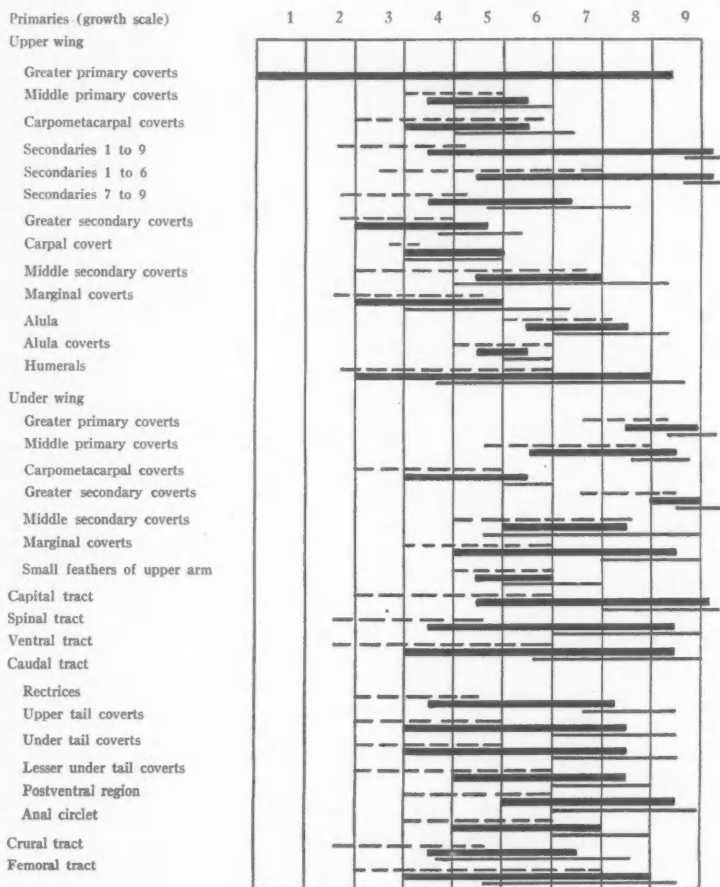


Fig. 43. Sequence of molt of the various feather tracts of adult House Finches relative to the growth of the new primaries. Dotted lines represent the range on the primary growth scale of observed beginnings of molt; light solid lines, the range of observed endings of the molt; heavy solid lines, the range in which the molt will usually be found.

*Sequence of the molt.*—In this work, as in that of several other writers, the molts of the feathers of the various tracts have been correlated in time relationship to the molt of the primaries. The graph (fig. 43) is an adaptation from Miller (1928, p. 411).

No thought of calendar time should be connected with this graph. The horizontal distance allotted to each primary represents the period of growth of that primary, from the time the old one falls (the extreme left) until the new one is fully grown (the extreme right). The light dotted line after the name of each feather tract indicates the range over the progress of the primary molt of the observed beginnings of the molt in that tract. Likewise the light solid line indicates the range of the observed completions of the molt of that tract relative to the progress of the primary molt. The heavy solid line indicates that usually the molt will take place in this tract while the primary molt is within the extremes marked by the ends of the line.

The positions of these lines were determined by plotting, for each feather tract, on a primary scale the same as the one at the top of this graph, the beginnings or endings (for a few individuals both) of the molt of this tract for a considerable number of birds. The earliest and the latest beginnings fixed the two ends of the light dotted line and the earliest and the latest endings fixed the ends of the light solid line for that tract. The ends of the heavy solid line were not fixed by a rigid mathematical treatment of the observed beginnings and endings, chiefly because most of the observations were not made at the moment the first old feather dropped or the last new feather reached full length and hence required a small adjustment. Giving weight to these adjustments this line was located by visual inspection of the chart sheet so that its length included most of the beginnings and most of the endings, leaving out only the unusually early beginnings and the unusually late endings of the molt. Further, this location was checked against the general impression gained by the examination of many birds during four molt seasons. For emphasis it is repeated that the heavy solid lines indicate for each tract that the molt of that tract usually will take place while the progress of the primary molt is between the two extremes of this line. For example, reading from this graph, the fall of the first rectrix has been observed to occur at many points in the primary molt between the falling of primary 3 and "primary 5 one-half grown"; the completion of growth of the last rectrix has been observed to occur at many points in the primary molt between "primary 7 two-thirds grown" and "primary 9 one-half grown"; and the rectrices usually molt while the progress of the molt of the primaries is between "primary 4 one-half grown" and "primary 8 one-fourth grown."

*Primaries.*—This graph, showing the time relationship between the molts of the primaries and of the other feather tracts, does not completely represent the molt of the various tracts. The primaries in particular should be discussed further. The molt begins with the loss of primary 1, the proximal primary, or with 1 and 2 at the same time. Sometimes 1, 2, and 3, and seldom 1, 2, 3, and 4 are gone at the same time. In one bird 1, 2, 3, 4, and 5 must have fallen at the same time, for they were found to be the same length when primary 6 was gone. Exceptions to the primaries being the first to fall are, occasionally, the loss of some or all of the upper greater secondary coverts and extremely rarely the loss of some or all of the upper greater primary coverts before any primaries are lost. After this beginning, the molt progresses through the primaries in a rather orderly sequence. It is unusual to find more than four primaries on one wing molting at the same time, six being the greatest number recorded, and when four or more are involved, more than half of them usually are nearly full-grown new feathers. The most common condition, about half the total, is that of two primaries involved at the same time. Of 389 adult birds studied for this purpose by plotting the condition of the primaries at the time of trapping, 2 had 6 primaries involved in the molt, 2 had 5, 19 had 4, 58 had 3, 200 had 2, 102 had 1, and 6 had none, that is, all nine primaries were present and fully grown, the proximal ones being new and the distal ones old.

At this point it seems pertinent to discuss the number of the primaries. Although we have not dissected or determined the attachment of the feathers, there is in the House Finch an extremely small feather, shorter than, and concealed under, the small upper ninth primary covert, which we regard as the rudimentary tenth primary. Its length averages approximately 6.3 mm. and that of the small overlying covert about 7.9 mm. We can find no tenth covert. This seems to be exactly the condition Miller (1928) found in the Loggerhead Shrike which, however, has one more primary than the House Finch.

*Upper greater primary coverts.*—This row of feathers is usually extremely regular in its relation to the primary molt. As the primaries begin to fall, each upper greater primary covert drops with the corresponding primary and is replaced at once, being fully grown when the primary is still short. Extremely rare exceptions are the few where all primary coverts dropped before the primary molt began. However, the statement that each falls with the corresponding primary needs modification as the distal end of the row is approached. The small ninth feather of this tract is, in all cases observed, dropped before the ninth primary. It falls when the seventh, or more often when the eighth, primary is gone and the small rudimentary tenth primary falls just after the renewal of this small ninth covert so that these two small feathers are, in all adults observed, replaced before primary nine falls. Associated with this departure from the rule, a lag is noted in the falling of the eighth, and sometimes of the seventh, upper greater primary coverts, these falling distinctly after the primaries beneath them. This is especially true of the eighth.

Because of the synchrony of the molt of these coverts with that of the primaries, no lines of observed beginnings and endings are shown on the graph.

*Upper middle primary coverts.*—These small feathers molt so nearly all at the same time that the order of molt within the tract seems of little moment. In at least some of the observed cases, the molt progresses from the proximal to the distal end and follows closely that of the carpometacarpal coverts.

*Upper carpometacarpal coverts.*—This small group of feathers, lying at and near the edge of the upper surface of the wing distal to the alula, molts just preceding, or occasionally with, the upper middle primary coverts. These also do not progress in orderly fashion but in most cases the new feathers seem to appear at one time. The first pinfeathers, however, are at the proximal end of the tract. We are not sure of the proper name for this group of feathers. Boulton (1927, p. 397) and Dwight (1900, p. 92) include these with the corresponding feathers on the under side of the wing in the carpometacarpal coverts. Miller (1931, p. 127) marks these as marginal coverts. If they are to be called marginal coverts, it should be stated that they molt a little later than the marginal coverts of the patagium.

*Secondaries.*—The graph, in addition to showing the whole secondary tract, numbers 1 to 9, also shows separately the two groups, numbers 1 to 6, inclusive, and 7 to 9, inclusive, because the latter group is sometimes called the tertials. Number 1 is the distal and 9 is the proximal feather. The molt in this tract begins with the fall of secondary 8, or rarely 8 and 9 fall at the same time, commonly about the time that primary 4 is half grown. Number 7 is considerably delayed, often being missing when primary 6 is lost. About this same time, relative to the primary molt, secondary 1 is dropped and from this point the secondary molt usually proceeds in a consecutive, orderly manner, but sometimes two or even three adjacent feathers may drop almost together and the rest be delayed for some time. Occasionally, even more irregularity than this occurs and number 6 falls and is replaced at the same time as 7, and in one instance 6, 5, and 4 fell when 7 fell and grew to full length before 1 fell.

*Upper greater secondary coverts.*—This tract is usually in molt between the falling of primary 3 and the stage when primary 5 is two-thirds grown; sometimes it shows an orderly gradation from new, full-length feathers proximally to pinfeathers at the distal end of the row, but much more often all drop at almost the same time. They are replaced rapidly.

*Carpal covert.*—The one carpal covert falls and is replaced as if it were a member of the upper greater secondary covert row, almost always after, but in a few cases before, the most distal feather of that row.

*Upper middle secondary coverts.*—These are distinctly later in molt than the upper greater secondary coverts, usually beginning about the time that primary 5 is one-half grown. They fall and are replaced rapidly with little order in their sequence. However, there is a tendency for the feathers to be younger distally in at least some of the cases observed.

*Upper marginal coverts.*—This tract is one of the first to show that the molt is extending beyond the primaries and upper greater primary coverts. These coverts are here limited to the upper surface of the patagium, the region between the alula and the humerals. The rows of new quills do not first appear at the border but below it, and the progression is downward, sometimes almost the entire area being in pinfeathers at one time. The rows nearest the border are always the last to be renewed.

*Alula.*—The alula, in almost every case, is found to drop and replace its feathers as the upper middle secondary covert molt reaches the distal end of the row and after the replacement of the alula coverts. The molt progresses distad.

*Alula coverts.*—The replacement of these follows immediately the completion of that of the upper marginal coverts.

*Humerals.*—The molt of the humerals progresses from anterior to posterior. This group often shows new quills at the anterior end when new ones first appear in the upper marginal coverts.

*Under greater primary coverts, under middle primary coverts, under greater secondary coverts, and under middle secondary coverts.*—With all of the coverts of the under wing it is difficult to time the molt exactly, for the feathers are small and those of each row are renewed almost at the same time. The new feathers look so like the old ones that it is difficult to be sure that the molt of the row is completed unless an individual bird can be examined frequently during the process. In spite of this it has been determined that in these four rows the molt progresses from the proximal to the distal end as shown on the graph. Perhaps it should be said that the first pinfeathers of each row appear proximally, and then the entire row appears to develop at the same time.

*Under carpometacarpal coverts.*—These are replaced almost simultaneously with the corresponding upper coverts and are the first of the under coverts to be molted. The molt progresses distad.

*Under marginal coverts.*—The progress of the molt in these feathers is proximad, with the long ones closest to the body being replaced last but before the completion of the under greater secondary coverts. There is considerable variation in the completion of the molt of these border feathers. Sometimes the entire row is of the new, full-grown, short feathers with the alternating long ones gone but growing out later. In other cases the long ones seem to keep pace in development with the short ones. The last to grow are always the most proximal long ones.

*Scattered feathers of the under surface of the upper arm.*—It is only in Dwight (1900, p. 92) that we find mention of these feathers. They are small, few in number, easy to find, and are usually molted between the time that primary 5 is one-half grown and the time that primary 7 is lost.

*Capital tract.*—Birds differ greatly in the appearance of the head during the molting period. Usually pinfeathers show first in the frontal region and from this point the molt extends back through the coronal region. The entire top of the head may be thick with new feathers at one time or, on another bird, the feathers may grow only a few at a time, thus keeping the head rough in appearance over a long period. In any case, the occipital region is long delayed and may fail to show new feathers when the appearance of the bird suggests that the molt is almost completed. The malar, loreal, ocular, and auricular regions will be found a mass of young feathers as the molt of the primaries is practically completed. The feathers of the eyelids molt about the time that primaries 6 and 7 are molting and the molt progresses anteriorly.

*Spinal tract.*—This tract shows quills first in the interscapular region. The molt progresses caudad and sometimes seems to unite with molt radiating from another center in the pelvic region. The entire back and rump are often full of pinfeathers at one time. In other birds the molt seems to progress from the interscapular center of origin over the entire tract in more orderly fashion. This is a large tract and much time is required to complete its molt but it is uniformly ahead of the ventral tract in completion. The cervical region of this tract is late in developing new feathers.

*Ventral tract.*—The molt in this large tract requires a long time for completion (about two months), during the greater part of which all stages of feather growth can be found in the breast where the molt of the tract is first observed as a single row of pinfeathers on each side. The extension of the molt of this tract with reference to the primary molt is more variable than in any other tract. The axillar region is late in molting and the interramal and submalar regions are a mass of young feathers as the primary molt is practically completed.

*Rectrices.*—The first tail feathers to fall are the middle pair. Apparently the normal procedure is for pairs to drop in regular succession thus giving in the early stages of the molt a forked tail, then a wedge-shaped tail, a rounded tail, and a normal tail as the molt progresses to completion. However, it is not unusual to observe two or even three of the inner pairs missing at the same time. The young growing tail feathers are easily injured and lost and replaced. Many peculiar tail shapes result from such losses.

*Upper, under and lesser under tail coverts.*—Whatever variation there is in the time of beginning the molt of the rectrices will be almost exactly duplicated in the beginnings of the molts of the upper and the under tail coverts. These begin to fall at the time the middle rectrices fall, or sometimes even before. The molt of the upper tail coverts is usually ahead of that of the lower by a small margin. The sequences of molts within these rows appear to have considerable irregularity, probably at least partly because of the ease with which the partly-grown feathers are fortuitously lost. However, the normal sequence in each row seems to be from the middle pair outward, as with the rectrices. Although these are short feathers, they do not appear to be fully developed until near the completion of the outer rectrices.

The molt of the lesser under tail coverts (Miller, 1931, p. 128) is slightly later than that of the upper and under tail coverts. All feathers of this row seem to molt at the same time.

*Postventral region.*—The molt of this small region is late, following that of the anal circlet. It precedes the completion of the molt of the ventral tract.

*Anal circlet.*—The feathers of this region are rapidly renewed, apparently all at the same time, before the completion of the molt of the ventral tract.

*Crural tract.*—The molt of this tract is not easily described as progressing either distally or proximally. A great many new quills appear almost simultaneously in the



fleshy region of the leg. The appearance of additional new feathers progresses both distally and proximally. Often the most proximal are the last to be developed.

*Femoral tract.*—The molt of this tract starts uniformly later than that of the humeral tract and, like the humeral tract, the appearance of new feathers progresses posteriorly.

*Exceptionally late molting adults.*—As stated in a previous section, the duration of the molt of an adult House Finch is from 90 to 120 days. However, a few have been observed which have begun the molt so late and in which the portion of the molt observed has developed so rapidly that we are led to think that their total molt period might be appreciably less than 90 days. In the birds beginning to molt before mid-summer there is a considerable time when only the primaries and the upper greater primary coverts (except in rare cases) are involved. In exceptionally late-molting adults this delay in starting the molt in other tracts is partly or entirely eliminated. Two examples are given.

An adult female captured on August 15, 1939, had primaries 1, 2, and 3 all short. It also had pinfeathers in upper marginal coverts, carpometacarpals, humerals, ventral tract, crural tract, femorals, tail coverts, and head. All the upper greater secondary coverts except one were gone. The molt might have been completed in less than 90 days. This bird was banded as an immature in July, 1935, hence was four years old.

For comparison the following records typical of the more usual molt are offered.

34-87930. Primary 1 gone on July 16. Retaken August 16 with primary 3 gone. No evidence of molt in any other tracts except upper greater primary coverts.

36-30336. Taken June 16 with primary 1 gone. August 1, primary 4 gone. No other tracts involved except upper greater primary coverts.

Another extremely late-molting bird was at least seven years old. It showed no sign of molt on August 11, 1939, had one primary gone on August 15, and on October 11 had primaries 1, 2, 3, 4, 5, and 6 new and full length, 7 one-half length, and 8 and 9 old. Secondary 1 was new and full length, 2 a short quill, 3, 4, 5, and 6 old, 7, 8 and 9 new. Molt of rectrices was complete except that the two outer pairs were still short. Molt was in progress in practically all the other feather tracts, whereas normally it would have been completed in several of them at this stage of the primary molt. The new colored feathers were yellow, the old ones red. This is our first observation of an adult male changing from red to yellow in the normal molt, although we knew that old males sometimes do this. Yellow adult males are not rare but we know many of them are first-year birds that were hatched late the previous breeding season. We think there may be some causative connection between old age, late molting, and the yellow color. Most of the adult birds leave us by mid-autumn, presumably to join in the large flocks in the open fields. Extensive collecting from these flocks might reveal a larger proportion than we have found of unusually late molting adults.

For convenience we are using in this paper the words red, yellow, or dull yellowish to indicate the general colors without attempting to give the exact nomenclature. In two of our previous papers (Michener and Michener, 1931 and 1932) these colors have been extensively discussed.

#### THE MOLT OF IMMATURES

*Method of study.*—The molt of the immature House Finches is more difficult to follow than that of the adults because relatively few young remain long enough for observations on the entire process and because many molt patterns are found in them. To get evidence of the process in many birds, over 2000 young were marked when first captured by snipping a few barbs in each primary, secondary, and rectrix on the right

side, thus leaving these feathers marked by a small notch until they were replaced. Some of these birds remained in the vicinity and repeated often for observation but great numbers of them apparently went away and returned at greater intervals during the time prior to their first postnuptial molt. They have shown us how extraordinarily variable is the molt of the immature House Finch. Feather notching was begun in 1935 on relatively few birds and was continued through 1936 and 1937, over 1500 being so marked in 1937.

*Breeding season, and the age of immatures.*—In discussing the molt of the immatures the breeding season of the House Finch is, of necessity, the first topic. The first young birds are captured in late April and the latest date on which an immature still showing natal down has been caught is September 16. Throughout this study a bird with natal down has been regarded as very young, for in the many handled repeatedly none has retained it more than a few days after the first capture. All immatures early in the season are, of course, of approximately known age. Later, the ones with natal down can be separated as younger and this has been our criterion of age although, as the season advances, the older young show fading and wear of the tawny-olive feather edgings and molt earlier than the late-hatched broods. By late August an immature with no molt in progress is quite certainly a late-hatched bird, but even at this season we have had enough young with natal down to lead to the conclusions we have drawn in this paper.

*Extent and sequence of the immature molt.*—The most striking feature of the molt of immatures is the great variability between different individuals in the extent of the molt in the wings and the tail. This variability is definitely correlated with the time of hatching for the various birds, but the time of hatching is evidently not the only factor influencing these variations since all young of the same age do not follow the same molt pattern. The general type of variation is that of refraining to molt increasing numbers of wing and tail feathers as the time of hatching advances. For convenience of presentation the birds will be divided into groups based on types of molt pattern rather than on dates of hatching.

There is sometimes irregularity between the two wings. For example, carefully watched birds were known to molt one more primary on one side than on the other, and this was true of secondaries and occasionally of greater primary coverts.

*Immatures following molt pattern of adults.*—Each year some of the first hatched young are banded in the latter part of April and repeat in our traps at frequent intervals throughout the summer and fall, thus allowing the entire molt to be observed. Their molt begins later than that of the first adults to molt, but in many of them the extent and sequence of the molt is the same as that of the adults. One typical of the group was banded on April 21. On July 18 primaries 1, 2, 3, and 4 were growing in. It repeated frequently for observation and the record of a complete molt ends on October 22 when secondary 6 was still a little short. Our evidence is that only the early-hatched young, and not all of them, molt in this way. The males of this group show the colored areas as red in the postjuvenile plumage.

*Immatures that molt all rectrices and secondaries 7, 8 and 9 but fail to molt some or all primaries and secondaries 1 to 6.*—This is a numerous group with many possible combinations of old and new feathers in the primaries and secondaries 1 to 6 after the postjuvenile molt period is completed. Old and new feathers in all cases mean notched or unnotched, hence juvenal and postjuvenile, feathers, respectively. Although the list of observed combinations fills several pages, it is probable that we have not found all that are possible.



In the birds of this group the first sign of the molt usually is not found in the primary tract, but the molt may begin almost simultaneously in many tracts. The upper marginal coverts, ventral, dorsal, crural and humeral tracts may show pinfeathers before the primaries begin to drop. A few begin the primary molt with no. 1 and retain some juvenal secondaries, and a few begin the secondary molt with no. 1, but the great majority fail to molt a few of the proximal primaries and a few of the distal secondaries until a year later at the first postnuptial molt. The entire process is compressed in addition to the omission of the renewal of a number of primaries and secondaries, the degree of compression and omission being proportional to and depending largely upon the lateness of hatching. Instead of the upper greater secondary coverts preceding in molt the upper middle secondary coverts, they both molt together. In the most compressed cases almost all tracts show molt at the same time. The upper greater primary coverts are not molted unless the corresponding primaries below them are molted. Aside from the unmolted secondaries, primaries and the upper greater primary coverts, the molt seems as complete as that of the adults but the time necessary is considerably reduced. The two examples of usual adult molt given in the section on "exceptionally late molting adults" show 31 days between the dropping of primaries 1 and 3 and 46 days between the dropping of primaries 1 and 4 and in neither case had the molt started in other tracts except the upper greater primary coverts. The inference is that an immature starting the primary molt with no. 3 or with no. 4, after having started the molt in many other tracts, will have a molt period in the order of 31 or 46 days, respectively, shorter than did these adults. There seems to be some rule of expediency in operation which we do not fully understand, but which appears to be largely influenced by the time available between date of hatching and early November, beyond which we have not found evidence of the molt continuing.

The extent of the variation in the numbers of primaries and of secondaries 1 to 6 that may be molted at the postjuvinal molt by birds that molt all rectrices and secondaries 7, 8, and 9 at that time is best explained by a statement of some of the combinations which this work has shown may occur. Some birds renew practically all these feathers. We record: All new except secondary 2; all new except secondaries 2 and 6; all new except primary 1 and secondary 2. The great majority retain some of the old proximal primaries and distal secondaries such as: Primaries 3, 4, 5, 6, 7, 8, and 9 new with a varying number of new secondaries: 6; 5 and 6; 4, 5, and 6; 3, 4, 5, and 6; 2, 3, 4, 5, and 6; 1, 2, 3, 4, 5, and 6. This same range of secondary variation holds for birds with only primaries 4, 5, 6, 7, 8, and 9 new and with only 5, 6, 7, 8, and 9 new. Occasionally the sequence of the new secondaries is disturbed by one or more old ones interspersed.

The greater number of birds molting in this manner begin the primary molt with no. 4 or no. 5. As the number of primaries molted decreases, the number of new secondaries also decreases, sometimes to none other than 7, 8 and 9.

There are instances in this group of birds of primaries 8 and 9 and even 9 alone being the only ones molted.

In this group of birds the molt of the upper greater primary coverts, each of which normally molts only when the primary beneath it molts, occasionally has irregularities other than the curious lag of nos. 7 and 8 as observed in the adults.

The rudimentary primary 10 and its covert molt, as in the adults, ahead of their order in their respective rows.

*Immatures that molt no primaries or secondaries 1 to 6 and fail to molt some or all rectrices or secondaries 7 to 9.*—This group is not separated sharply from the previous group. Whereas we have no record of a bird molting any primaries that failed to molt

all 12 rectrices, we do record one which replaced no primaries and did replace secondaries 5, 6, 7, 8, and 9, and rectrices 1-1, 2-2, and 6-6. Another replaced no primaries; it did replace secondaries 7, 8, and 9, and rectrices 1-1 and 6-6, which places this bird properly under the above heading. This pattern of the molt of the rectrices proved to be rather common. Another molted secondaries 7, 8, and 9 and rectrices 1-1, 2-2, 3-3, 4-4, and 6-6, but no primaries. These partial molts of the rectrices are as common as they are of the primaries and secondaries. In all cases, where any of the rectrices were molted, secondaries 7, 8, and 9 were also. Some of the late young returned with all rectrices, primaries and secondaries, except 8 and 9, or 9, unmolted.

*Immatures that molt none of the primaries, secondaries or rectrices.*—This group of very late-hatched birds is small in number. One (36-67246), banded on August 12, showed no sign of molt at almost daily observations until August 30 when a few pinfeathers were found in the upper middle secondary coverts. By October 18, except for the last traces about the head, the molt was completed, and the bird carried all the notched flight feathers. This, allowing a few more days, was well within two months for completion of its molt.

Another (36-67649), banded on September 16 while still with down on its head, was molting in the ventral, dorsal, upper greater and middle secondary covert tracts. On September 26 there was a trace of yellow on its head. By about November 1 it had completed its short molt into male plumage of such dull color that no one would have called it a male if seen free.

Comparisons of the probable dates of hatching of young and of the ages when their molts began is pertinent. The first, banded on August 12 without natal down on the head, waited 18 days before its molt began while the second, banded on September 16 with natal down, was then in active molt.

In the birds that molt no rectrices, primaries or secondaries, we have found the small ninth primary covert and the rudimentary primary ten molting in some cases. This was suspected from the color of these feathers before it was actually observed. It does not seem to occur in all cases.

In 1938 two of the latest-hatched birds captured were left in a large cage, because of the uncertainty of recapturing them frequently, to see if greater disparity between the molt of the adults and that of the latest-hatched young could be found. One of these (38-97120) was banded September 30 while in the early stages of its molt. The other (38-97152) was banded October 12, its molt being less advanced than that of the first. In each bird all the tracts that molted any feathers were involved at the same time. In 38-97120 there was no molt of any of the under wing coverts and the two distal feathers of the alula were not molted. In 38-97152, even more of the juvenal feathers were not molted. On the wing it renewed only the more proximal of both the upper greater and upper middle secondary coverts, the alula coverts and the most proximal of the three alula feathers. In addition to shortening the molt period by omitting the molt in some of the tracts, these two birds, by finishing their molt of the dorsal and ventral tracts in much less time than required by adults, lead to the thought that the molt of some of the feathers of these tracts also may have been omitted. Further observations would be necessary to settle this point.

In the areas normally red in adult males both these birds molted to a dull yellowish tinge, and the areas so colored were much smaller than the normal colored areas. Except in the hand they would be regarded as females.

The colors of the male postjuvinal plumages have been observed to vary all the way from the reds of the adults to the dull yellowish tinge of the late-hatched birds de-

scribed above, this gradation from red downward following in general the increase in the number of juvenal flight feathers retained after the postjuvenal molt, although there is a wide variation of color for any one molt pattern. The birds having the dullest postjuvenal plumage are often the first to start the first postnuptial molt.

We hardly can assume that we have caught the latest-hatched House Finch. Is it not possible that even later ones or birds hatched earlier in a harsher climate might fail to acquire even a trace of yellow at the postjuvenal molt? This is a possible explanation of the first winter males from the Charleston Mountains, Nevada, as reported by van Rossem (1936, p. 52), that were in the female type of plumage. Plumage color has been our only criterion of sex differentiation. All birds with dull yellowish or brighter colors on head, rump and throat have been called males. Those with dull yellowish on rump only, in addition to the normal female plumage, have been called females. Many of them have been known to be females. Obviously, dissection, to determine sex, at the first capture would preclude following the sequence of the molt in that individual and to dissect a bird after it has been repeatedly in hand over a long period during which it gives many evidences of becoming acquainted with and placing trust in its captors is not within the realm of our activities. So the most we can say is that from our own work we do not know of any male House Finch having a postjuvenal plumage without some trace of red or yellow. However, Moore (1939, pp. 180-181) in his studies of a large number of specimens finds in the coastal group of House Finches, which group includes those of our region, 1.2 per cent of the first winter males in the female type of plumage as compared with 7.4 per cent in the desert and plateau groups.

*Effect of environment on plumage.*—For some years our work on feathers has focused our attention on the effect of environmental changes on the plumage of individual birds. The bars that may show in all plumages and that become especially marked in any replacements made later than the normal molt, and the bands on juvenal feathers produced by any marked change in the bird's life are discussed in our last paper (Michener and Michener, 1938). The color of the male House Finches, particularly after the postjuvenal molt, and the adjustment of the number of feathers molted to the date of hatching are additional evidence of the flexible characteristics of the feathers of birds and of the importance of the annual postnuptial molt in holding the species to its characters. In all cases in which there are bands, overly strong bar patterns produced as winter replacements, shorter and paler flight feathers left unmolted after the postjuvenal molt, as well as yellow or yellowish brown on the male young of the year, these characters are replaced by the normal in the postnuptial molt. This restoration of the characters of the species is as impressive as the variation.

Our work is entirely with the population visiting one city lot from unknown distances in the surrounding area. Nevertheless, we have given considerable thought to the possibilities in the other members of this widespread species. It is, therefore, a great satisfaction to read Moore's paper (1939) in which he points out the numerous divisions of the subgenus made largely on the basis of plumage.

Molt studies of a species often offer a basis for the understanding of many events in the history of an individual by the examination of its plumage. Also, as shown by Miller (1933), the time of molt and its effect upon the postjuvenal plumage, if any, is worthy of study particularly with reference to the same species in different localities. Roberts (1932, p. 691) reports that Brewer Blackbirds in Minnesota molt from immature to adult plumage in late summer. Our many records show that the Brewer Blackbird here begins the postjuvenal molt as soon as or even before parental care ceases in the latter part of May at the earliest. By June the molt is evident in most of the immatures and

adults captured. May it be that when the same species molts at different times in different localities changes tending in the direction of race differentiation are in progress which might be detected by thorough molt studies, and might such molt studies of the different races of House Finches prove intensely interesting?

*Molt observations on some other birds.*—While studying the molt of the House Finch, we have handled many other species and have marked the wings and tails of all late-hatched young caught. The late-hatched young of Song Sparrows, Mockingbirds, California Jays, California Towhees, and Spotted Towhees do not molt all the flight feathers while the young of the earlier broods do. The number of notched feathers remaining until the postnuptial molt has varied in different individuals and we do not know at this time the extent of such variation.

On the other hand, immature Brewer Blackbirds and English Sparrows have never been observed to vary in any way from a complete postjuvenile molt. The immature blackbirds are comparable in age to the first young House Finches which we catch in April. These House Finches show no evidence of molt until July but the young blackbirds are beginning to molt at the time the parents cease feeding them, the earliest in the latter part of May. But the English Sparrows are hatching young throughout the spring and summer and in no case have we found one that did not complete its postjuvenile molt.

For a number of years we have watched warblers for evidence of the postjuvenile or postnuptial molt. We capture a few on the northward migration after the House Finches are nesting and almost at the time the earliest molting House Finches are beginning the molt. The warblers return as stragglers in July and August and many more in September at the height of the House Finch molt but none has shown even the last secondary short. The molt must be for them much more rapid and at a more definite time than it is for the House Finches.

#### SUMMARY

This work is based on observations over a period of four years on the House Finches handled at a banding station banding from 2000 to 2500 House Finches per year and having many times that many repeat captures.

Subsequent to the postjuvenile molt the annual autumnal or postnuptial molt is the only molt of the species.

The postnuptial molt is complete. It begins with the falling of primary 1 and ends with the completion of secondary 6; the time required is approximately 105 days, varying from 90 to 120 for different individuals. This molt has been observed in progress from May 15 to November 10.

There is a general sequence of molt of the feathers in a tract and of the tracts relative to each other, but there are also many variations from this sequence.

The extent of the postjuvenile molt was studied by notching all flight feathers on the right side of over 2000 juveniles.

The postjuvenile molt of the early-hatched young was found to be the same as the postnuptial molt of the adults while the latest-hatched young shortened the molt period by beginning the molt soon after leaving the nest, by retaining all juvenile flight feathers, and by molting all the other tracts more nearly at the same time. Those hatched at intermediate times varied the time of beginning the molt relative to age, molted a varying number of the flight feathers, and compressed the molt of the other tracts proportionately to the time available between the date of hatching and early November.

Although there are individual differences, it is generally true that the postjuvenile male plumages are red on the head, throat and rump in the earliest-hatched birds and in those hatched successively later, these areas are less and less red and then less and less yellow until the latest hatched show only a dull yellowish tinge.

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*Pasadena, California, October 30, 1939.*

## A NEW PLEISTOCENE TURKEY FROM MEXICO

WITH TWO ILLUSTRATIONS

By LOYE MILLER

Dr. Chester Stock of the California Institute of Technology has very generously placed in my hands for study a collection of several hundred bird bones from a Pleistocene cavern in northeastern Mexico. The work of exploration is still in progress and final publication on the collections appears to be a matter of the distant future. It is felt advisable, therefore, to place on record certain species that are new to science so that they may become available to all workers in the various fields interested.

Because of the considerable variety of turkeys that formerly existed in North America and the greatly impoverished present day status of the family Meleagrididae, a new and well marked species from northern Mexico claims a measure of interest.

The bird is here designated as

*Meleagris crassipes* new species

*Type*.—No. 2708, Calif. Inst. Tech.; tarsometatarsus of adult male; Pleistocene, San Josecito Cave, Nuevo León, Mexico.

*Diagnosis*.—Smaller than either Recent species of turkey; foot almost equal to *Agriocharis ocellata*, but metatarsus much shorter; spur located almost half way up the shank; spur directed less backward than inward.

## MEASUREMENTS OF TYPE OF MELEAGRIS CRASSIPES IN MILLIMETERS

Total length, intercotylar tubercle through middle trochlea.....	114.3
Minimum transverse diameter of shaft below spur core.....	8.3
Width through trochleae.....	19.8
Mid-point of spur base through middle trochlea.....	52.4
Mid-point of spur base through intercotylar tubercle.....	59.8

Turkey bones began to appear during the very early days of exploration at the cave and it was soon evident that they represented a species that was new to science. Limb bones and coracoids represented both sexes and various ages of the bird, but unfortunately the cave rodents of the Pleistocene seem to have had a marked appetite for the keratinous sheath of the foot bones. The spur core and the hypotarsus were often entirely nibbled away. In studies of the Rancho La Brea turkey, *Parapavo*, the characters of these particular parts were considered to be of especial taxonomic importance,

but not until the exploration of the cave had progressed for some time did a spurred tarsus become available. The position and the proportions of the spur core proved to be different from any of the turkeys heretofore studied. Both the transverse and the proximodistal diameters of the core are greater than in *Meleagris gallopavo*, *Agriocharis*, or *Parapavo*. The position is relatively far up the shaft. Elevation of the spur may be measured from the center of the spur core to the extremity of the middle trochlea. This distance is equal to 45 per cent of the total length of the bone in *M. crassipes*. It is 43 per cent in *M. gallopavo*, 42 in *Parapavo*, and 35 in *Agriocharis*.

The angle at which the spur stands in relation

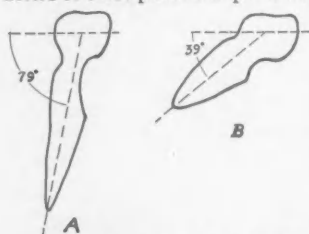


Fig. 44. Cross section of right metatarsus and spur core of (A) *Parapavo californicus* and (B) *Meleagris crassipes*, showing angle at which spur stands with the frontal plane of the bone (x1). Drawing by Gretchen Lyon.

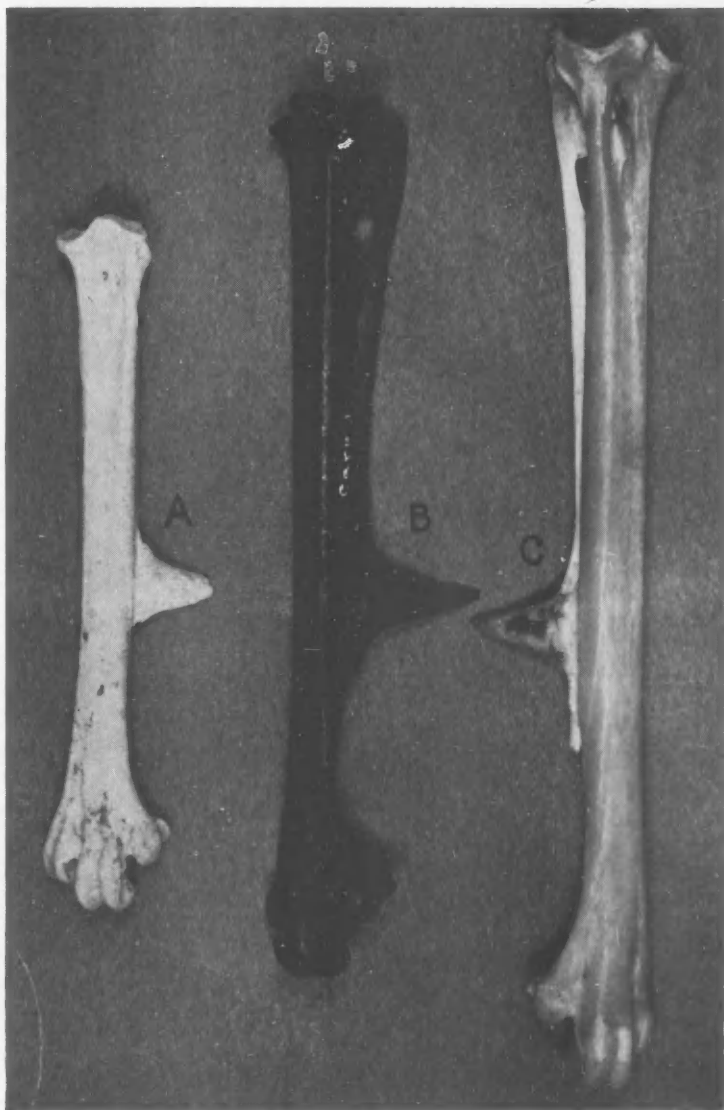


Fig. 45. Tarsometatarsi of (A) *Meleagris crassipes*, (B) *Parapavo californicus*, and (C) *Meleagris gallopavo sylvestris*, all x1.



to the frontal plane is of especial interest. In all the other turkeys at hand, the spur projects almost directly backward, being but slightly inclined toward the mesial line. In *M. crassipes* this inward slant is so exaggerated that the spur comes to project more inward than backward (see fig. 44). The spur is set more firmly upon the shank, with broader and heavier buttress and the ridge running up the shaft from the base is thicker and heavier. On the other hand, there is less of a ridge distal to the spur. Both of the living turkeys, as well as the Pleistocene *Parapavo*, are alike in having quite a strong supporting ridge running down the shank below the spur. In *Agriocharis* this ridge reaches to the base of the hind toe.

The proximal end of the tarsus is too far from perfect to afford exact measurements, but to the eye it is evident that, were it complete, it still would be narrower than in *Parapavo*. At the level of the papilla of the tibialis anticus it is almost of equal width, whereas through the whole middle zone of the shaft it is broader. Through the trochleae it is slightly narrower than in *Parapavo* though the total length is but 79.8 per cent that of the California bird.

Compared with *Agriocharis ocellata* the tarsus and tibia both are shorter and stouter, but the wing bones and coracoid are smaller. There is thus indicated a bird with small body and wings, but with tremendously heavy feet, armed with an unusually stout spur.

Five extinct species of *Meleagris* have previously been described, by Cope, Marsh, Shufeldt and Wetmore, but into none of these categories does the cave bird fit. *Meleagris celer* Marsh is described as small and slender legged; *M. superba* Cope (= *M. altus* Marsh) was as large as the modern bird, but much taller, the leg bones being almost like those of a wader; *M. antiquus* Marsh was nearly the size of *M. gallopavo*; *M. richmondi* Shufeldt was half the size of the modern bird which would make it much less than the cave bird; *M. tridens* Wetmore was about like the modern turkey except for the multiple spurs.

The California turkey (*Parapavo*) was a larger bird with a more slender, gaff-like spur and an incipient third ridge in the hypotarsus that was fairly constantly present. The outer toe was also raised to a higher relative position than in the true turkeys. The Mexican bird here discussed more closely resembles *Meleagris* in these tarsal characters. Assignment to the typical genus of the turkeys is considered wisest from the study of the present material. Should further excavation bring to light the characteristic body bones, the generic position may need to be revised.

It is considered most probable that turkey remains occur in San Josecito Cave as the result of their having been carried in as food by predatory birds and mammals that would be less inclined to crush bones of the foot and wing than of the head and body. Sooner or later, however, there should appear in the collection, representation of most of the skeletal elements if the deposit continues to prove fossiliferous.

Superficial layers upon the cavern floor showed evidence of human occupation. The material here discussed comes, however, from below the layer of ash and charcoal. A more or less typical Pleistocene mammal fauna is identified by Stock and the bird remains thus far identified indicate much in common with Rancho La Brea in the Pleistocene of California. More careful correlation will be hoped for with the further progress of exploration.

*University of California, Los Angeles, October 26, 1939.*



## VARIATION IN THE AMERICAN GOSHAWK

By P. A. TAVERNER

The American Goshawk (*Astur atricapillus*) ranges in the Boreal Zone across the northern parts of the continent and southward along various mountain ranges. It is not strongly migratory and is usually resident wherever found though showing some seasonal shift of territory and occasional winter eruptions southward.

The Western Goshawk (*Astur atricapillus striatulus* Ridgway) was separated from the type form of the species principally on the basis of a more finely vermiculated breast and ventral pattern in the adult. The describer in his original diagnosis (*in* Baird, Brewer and Ridgway, *Hist. N. Amer. Birds*, vol. 3, 1874, pp. 238-240), expresses residual doubt as to the distinctiveness of the characters thus stressed, and his hesitation seems justified. A casual examination of a more ample series than he had available demonstrates that fineness of pattern has no particular geographical distribution. Both finely and coarsely marked birds appear indiscriminately throughout the specific range from coast to coast.

Further investigation indicates that this fineness of pattern is an age, not a racial character. In a series of 53 adult specimens taken across continent, a number are changing from striped juvenal to gray adult plumage, or are in practically complete adult gray habit with a few relict feathers of juvenility. In every such transitional plumage, east or west, the incoming or new gray pattern is of the coarsely vermiculated type and no finely vermiculated specimen that the writer has seen shows any trace of striped juvenal feathers. It is strongly suspected that fineness of vermiculation may progressively increase with age resulting in an extreme condition with advanced years. In any event, as has been pointed out before, this character must be abandoned in this species as distinctive of geographical race.

In the original description Mr. Ridgway designates no particular type but he lists and describes under *striatulus* four specimens, two adults and two juveniles, in comparison with an equal number of comparable birds that he ascribes to *atricapillus*. Under these conditions and the intent of the Code of Nomenclature, the first *striatulus* thus specified has been taken as the accepted type of the race and is so given in the A. O. U. Check-list. The two adults are, in order: Type, U. S. Nat. Mus., 8508, ♂, Ft. Steilacoom, Puget Sound, W. T. (= State of Washington), no date, Dr. Suckley; U. S. Nat. Mus., 58982, ♀, Colorado (loc.?, date?), Dr. F. V. Hayden.

Through the courtesy of Dr. Herbert Friedmann and the United States National Museum we have had the privilege of comparing these birds with a series of fully adult and finely vermiculated birds in the National Museum of Canada, and with those kindly loaned by the Royal Ontario Museum of Zoology and the Provincial Museum of British Columbia.

- ♂ Prince Edward Island, June 20, 1938 (breeding)
- ♂ Kingsville, Ontario, winter, 1926
- ♂ Point Pelee, Ontario, Nov. 8, 1916
- ♂ Lac La Nonne, Alberta, May 30, 1926
- ♀ Westmorland County, New Brunswick, 1928
- ♀ Ottawa, Ontario, Nov. 14, 1916
- ♀ Richmond, Ontario (near Ottawa), Dec. 15, 1918
- ♀ Treesbank, Manitoba, Jan. 24, 1927
- ♀ Lac La Nonne, Alberta, May 31, 1926

No material distinction between these birds and the type specimens can be made. The series shows a certain amount of variation that may be either individual or the result

of age, but both the type specimens in question can be matched perfectly in the series. It is evident that, as defined and thus exemplified, the races *striatulus* and *atricapillus* are indistinguishable.

The following cross-continental series of adults are available for review:

Canadian Labrador.....	1
New Brunswick.....	1
Prince Edward Island.....	2
Quebec.....	2
Ontario.....	11
Manitoba.....	5
Saskatchewan.....	1
Alberta.....	8
Mackenzie.....	2
British Columbia.....	16
Alaska (Chitna Glacier).....	1
Colorado.....	1
California.....	1
Washington.....	1

53

These arranged in geographical series exhibit no consistent departures from eastern types, but a group from the coastal islands of British Columbia and two that apparently are unusual variants stand out strongly from the rest:

♂ Victoria, Vancouver Island.....	Dec. 4
♂ Upper Campbell River, V. I.....	July 22
♂ Nanoose, V. I.....	Jan. 24
♂ Denman Island.....	Dec. 18
♀ ? Comox, V. I.....	Mar. 12
♀ Quatsino, V. I.....	Oct. 4
♂ Cape Scott, V. I.....	Sept. 19
♂ Skidgate, Queen Charlotte Islands.....	Aug. 2
♀ Massett, Q. C. I.....	?
♀ Skidgate, Q. C. I.....	Aug. 2
♀ Queen Charlotte Islands.....	?

## VARIANTS

♀ Mackenzie Delta, N. W. T.....	June 12
♀ Big Trees, California.....	?

These include both finely and coarsely marked birds, but all show degrees of darkening. Below, the gray is of darker (sootier) tint, especially across the breast, with heavy shaft streaking. Above, the black of the cap extends over the shoulders and the interscapulars. There is considerable variation. In extreme cases, shown by three coarsely vermiculated birds, the tendency is marked and conspicuous, almost amounting to melanism; in others the saturation is less and approaches occasional darker eastern specimens. Outstanding geographical exceptions are a male from Prince Edward Island that might easily fit into the darkened series and one from Cape Scott, Vancouver Island, that might fit among the lighter birds of the East. The coarsely vermiculated yearlings (?) show the darkening in most pronounced degree, although some finely marked adults retain it strongly. It seems to have a tendency to reduce with age and some very old birds may be uncertainly recognizable. It is notable that this darkening seems confined to the coastal islands; specimens from closely adjoining mainland localities (Kingcome Inlet; Stuie, Bella Coola region; Brackendale; Chitna Glacier, Alaska) do not show it. The bird from Big Trees, California, is well marked and may be a wandering migrant, but the Mackenzie Delta specimen is disturbing. It is very coarsely marked below,

with vermiculations broadened almost to regular bars that approach those of the European *A. gentilis*. The shaft streaking is very heavy and general appearance is typical of the dark island phase. It was mated with a perfectly normal fully adult male *atricapillus* which with the downy brood is in the collections of the National Museum of Canada. Under the circumstances it can be regarded only as a variant along with the dark Prince Edward Island breeding bird and a strange abnormal bird in the Museum of Vertebrate Zoology from Atlin, British Columbia, that is a pale extreme, almost suggestive of the Asiatic *A. gentilis albidus*.

Sixty-two specimens in striped juvenal plumage are available for examination. These divide into three well marked color groups:

- 5 from the Queen Charlotte Islands
- 19 from Vancouver Island
- 38 from the mainland east to Prince Edward Island, north to Chitna Glacier and Yakutat Island, Alaska.

62

The contrast between the Queen Charlotte and the mainland groups is marked and conspicuous. The former is consistently dark. Above, the brown is rich and deep with little or no trace of lighter feather-edging or variegation. Below, the ground color is exceptionally deep, varying from Cinnamon-Buff to Light Buff (Ridgway's nomenclature) with the stripes many, broad and very dark. In the mainland birds the browns are less rich; above there is much variegation with light feather-edging and semi-concealed spots. Below, the ground averages cream color and varies from almost white to as dark as the lightest of the island types. The stripes are slightly more sparse, narrow and less densely dark. It is not believed that the density of the ground color below is as significant as the other characters, for there is a suspicion that it is more or less evanescent as in the similar breast tint in juvenal *buteos*. Though young birds recently from the nest are always more deeply colored in this respect than older ones, especially those that have worn the livery for almost a year, these island juveniles are more heavily colored than other specimens of approximately the same age.

The nineteen birds from Vancouver Island are intermediate between the two extremes. In massed average, the intergradation is distinctly recognizable, though among them are individuals that might be included in either group without much violation of consistency.

From these comparisons it appears that there is a recognizable strain of goshawk on these islands distinct from *atricapillus* of the continental area. It is strongly characterized in some adults in both island groups though juveniles exhibit it more distinctly on the Queen Charlotte Islands than on Vancouver Island where the birds appear somewhat intermediate.

The nomenclature of this race is not clear. That Ridgway had some intention of defining a dark colored race is suggested by his remarks at the bottom of page 239 (*op. cit.*) of his description, but the fact remains that by neither diagnosis nor example did he succeed in doing so. The two adults he cites are straight *atricapillus*. His two juvenal *striatulus* are: U. S. Nat. Mus. 59892, Colorado (date?, loc.?; sex inferred to be ♂), F. V. Hayden; U. S. Nat. Mus., 11740 (should be 11790), Puget Sound, October 26, 1858, Dr. C. B. Kennerly.

The first of these may be ruled out on geographical considerations, Colorado being far removed from the area in which the dark race centers. It is evident that of the four specimens none of the first three can be taken as the type of the race now suggested. There remains only the fourth specimen from Puget Sound to represent the describer's

*striatulus*. By description and locality this may be a straggler or migrant from the islands. At my request, Dr. Friedmann has compared this specimen with typical examples of the insular form sent him for the purpose and he states that it agrees quite well with them, especially with the Vancouver Island type which is not as strongly marked as that from the Queen Charlotte Islands. The inclusion of this particular bird in Ridgway's *striatulus* seems to have been more or less accidental and the elimination of three other specimens having page priority over it seems to reduce its availability as a type of the described race. Much as we regret to change old and established names on nomenclatural technicality, this seems a case where it may be advisable. The literature has many references to the Western Goshawk founded on misconception of both characters and range. It seems best to allow these unfortunate records to be cancelled out through synonymy than to cause confusion by applying an old name to a new concept. I therefore propose

***Astur atricapillus laingi* new subspecies. Queen Charlotte Goshawk**

(Named in honor of Hamilton M. Laing, who has been instrumental in uncovering the form.)

*Type*.—National Museum of Canada, 15899, adult (♀?), Masset, Queen Charlotte Islands, British Columbia, February, 1920. Collector, W. J. G. Hellier.

*Diagnosis*.—Like *A. a. atricapillus*, but faintly to distinctly darker especially in first and second year. Adult, sootier gray ventrally especially across breast, typically with many broad shaft streaks. Dorsally with the black of cap and nape extending over shoulders and the interscapulars. Juvenile, breast stripes very broad and heavy on a light ground that averages deeper in color than in *atricapillus*. Dorsally almost or quite solid rich dark brown with little or no light feather-edging or semi-concealed markings.

*Range*.—As far as now known, the islands of the British Columbian coast. Most typical on the Queen Charlotte Islands, the birds of Vancouver Island being more variable and less plainly characterized. Probably resident, with little migratory movement.

*Ottawa, Ontario, January 12, 1940.*

## A TRANSITION ISLAND IN THE MOHAVE DESERT

By ALDEN H. MILLER

Clark Mountain in northeastern San Bernardino County, California, rises to a sharp crest, 7900 feet in elevation. It is somewhat isolated from the lower Ivanpah and Mescal ranges to the south, and on the north is surrounded by low desert basins. The upper parts of the mountains in this section of the Mohave Desert are openly forested with junipers and piñon pines and present a forbidding aspect to summer resident species that frequent Boreal and Transition life-zones.

On May 17, 1939, after hunting up through the Upper Sonoran Zone of the south side of Clark Mountain, I came abruptly to the brink of cliffs that formed the north face of the peak. Below, partly in the shadow of the cliffs, I became aware of a scattering of fir trees, and within a few minutes the song of a Mountain Chickadee carried up to me from the forest below. Here was an extremely small insular area of Transition Zone that challenged exploration to determine what avian species had there found an extent of habitat sufficient for summer residence.

On May 20, 24, and 28 members of our party visited the base of the cliffs. Mr. Ward C. Russell and Mr. Ronald Smith spent the night of the 28th there. The firs (*Abies concolor*) occurred in two patches at the heads of canyons where the rock walls rose 300 to 500 feet above. Each patch was roughly triangular, broadest at the base of the cliff and tapering down the slope below to a point about a quarter of a mile distant. The slopes were extremely steep and for the most part rocky. At the bases of the cliffs were small patches of snow which must have persisted until June 1. There was no surface water.

It could be seen that local conditions were in several respects ideal for the maintenance of a Transition biota at this comparatively low elevation in the desert. The cliffs formed a cirque, the center of which faced northwest. The northeast ridge of the mountain cut off the early morning sun and the top of the peak shaded the area early in the afternoon. Some of the firs received only four or five hours of sunlight on May 20 and the entire area was shaded in the morning until 8 a. m. Although there were no streams, snow at the bases of the cliffs must afford a substantial reservoir of moisture during the spring and a good supply of underground water evidently was available to plants high up in the drainage channels.

Floral associations were nevertheless distinctly mixed. The firs in no place formed a pure stand but had piñons interspersed, often to the extent of 40 per cent or more. Small firs formed solid stands in a few places in the bottoms of ravines and here there was fair top soil. Currant bushes (*Ribes cereum*) provided extensive ground cover and there was a good scattering of service berry (*Amelanchier alnifolia*). Snowberry (*Symphoricarpos longiflorus*) and alum root (*Heuchera rubescens*), plants of montane type, also occurred. In among the wild currants was an occasional sickly opuntia cactus, pale green and stunted, that must have dropped down from the arid crest above.

The two patches of firs were separated by about 300 yards of dry rocky slope. Each patch comprised approximately 20 acres. The eastern area (A) extended up to 7300 feet and the western area (B) to 7100 feet elevation. The apex of each triangular area was about 500 feet lower than the base of the cliff.

The circumscribed nature of the Transition areas made it possible to determine rather accurately the number of breeding pairs of most species of birds restricted to them and thus the population density per unit of habitat area. As will be seen in the species accounts which follow, the breeding population of each restricted species was exceedingly small.

Clark Mountain is 50 miles south of the Charleston Mountains of Nevada, from which range van Rossem (Pac. Coast Avif. No. 24, 1936) has reported a Transition and Boreal avifauna. Most of the species are there represented by races with affinities to the east or to the north. As would be expected, the birds of Clark Mountain are racially identical in nearly all instances with the Charleston birds and constitute southern or southwestern records for the breeding season.

Flammulated Screech Owl. *Otus flammeolus flammeolus*. A female (no. 77347, Mus. Vert. Zool.) was taken May 20 at 9 a.m. in a fairly dense stand of young firs. No eggs had yet been laid, but yellow ova up to 4 mm. in diameter indicated that nesting was under way. Heretofore this species has not been known in the Great Basin region south of southern Utah (Woodbury, Condor, vol. 41, 1939, pp. 157-158) and the Argus Mountains of Inyo County, California (Huey, Auk, vol. 49, 1932, p. 107). Although it usually breeds above the Upper Sonoran Zone, several have been taken in the lower margins of the Transition Zone (L. Miller, Condor, vol. 38, 1936, p. 228), and the one from the Argus Mountains in the piñon association. Because the species occurs south through Arizona and Mexico, it probably is present on other desert ranges, such as the Charleston and Hualpai mountains.

Broad-tailed Hummingbird. *Selasphorus platycercus platycercus*. This hummer was especially numerous in the tangles of *Garrya flavescens* from 6000 feet upward on both north and south slopes of the mountain. Where this plant formed thickets over the dry water courses, males were stationed and diving over females. As many as five males were counted in one patch of brush 200 yards long. A female was seen gathering material from the ground. No nests were found, but it seems fairly certain that the species was breeding in this particular association of the piñon belt and also in lesser numbers in the patches of Transition timber, where a few were seen. Broad-tailed Hummers are absent in the Providence Mountains to the south. Van Rossem found them to be abundant in the Charleston Mountains, but at elevations above 7500 feet. In the White Mountains of California this hummer also breeds in the upper piñon belt (Grinnell, Condor, vol. 20, 1918, p. 87). Comparison of five males (nos. 77361, 77362, 77364-77366) from Clark Mountain with material from central Nevada and Arizona revealed no constant pattern of geographic differentiation, the situation being much as described by van Rossem (*op. cit.*, pp. 26-27).

Hairy Woodpecker. *Dryobates villosus leucothorectis*. A pair was nesting in Area A and had just laid eggs on May 20. The nest was situated in the dead top of an old fir tree where there was a series of holes suggesting long utilization by these woodpeckers. No other Hairy Woodpeckers could be found in either area of firs. The birds (nos. ♂ 77377, ♀ 77376) are typical of *leucothorectis*, the breeding range of which race thus is extended southward in California.

Violet-green Swallow. *Tachycineta thalassina lepida*. These swallows were nesting fairly commonly in cliffs above the Transition areas and on shaded cliffs of canyons on the south side of Clark Mountain above 6500 feet. No accurate estimate of numbers could be made. Although distinctly a high zone type, here reaching its southernmost breeding post in the lower Colorado River basin, the species was of course in no way directly related to the patches of fir association. A female (no. 77468) collected on May 21 had an egg in the oviduct.

Mountain Chickadee. *Penthestes gambeli inyoensis*. One male was situated in Area A and two males in Area B. The males were singing regularly and were unaccompanied by females or young. Their behavior was typical of males during the incubation period and their testes were of maximum size. The population in the 40 acres may be assumed to have consisted of three pairs. Area A seemed to provide room for one more pair, in view of the situation in area B, but repeated efforts to locate others in A failed. The male chickadees usually confined their movements to the firs, only briefly visiting the interspersed piñons. This race of chickadee is abundant in the Charleston Mountains above the 7500 foot level. In the condition of moderate wear which the specimens (nos. 77440-77442) show, it is not apparent that the characters of *inyoensis* are developed in unusual degree, as van Rossem has suggested for the Charleston Mountain birds.

Hermit Thrush. *Hylocichla guttata polionota*. In Area A, two birds were in full song on May 20. Before the sun struck the area, they sang from exposed piñons on the ridge, but later they retreated to the densest groups of young firs near the middle of the area. A female (no. 77515) was taken here on this date. The ova were developing (1 mm. in diameter), but laying was not imminent. The female behaved as do breeding birds, whining and flying about nervously in the firs. On May 24 a male (no. 77516) was taken in Area B; the testes were of maximum size (9 mm. in length). There possibly were two pairs in B and the total population may be estimated at four pairs.

Mexican Bluebird. *Sialia mexicana bairdi*. Two males (nos. 77520, 77521) were taken; each was accompanied by another bluebird. Observations indicated the presence of one pair in Area A and

probably two in B. The population fairly certainly did not exceed three pairs. The bluebirds did not stay in the firs all the time, but none was seen far distant from them. The males taken were in full breeding condition and it is supposed were nesting. They show an extreme extension of brown dorsally across the back and posteriorly on the flanks and must therefore be designated as *bairdi* pending much needed revisionary study of the characters and ranges of *bairdi* and *S. m. occidentalis*. Van Rossem found that specimens from the Charleston Mountains were closer to *occidentalis*.

Virginia Warbler. *Dendroica virginiae*. Two males were stationed in Area A. One had a beat near the base of the cliffs in open firs and piñons, with open tracts of shrubs between. The other was in the lower limit of the area on a slope with piñons and service berry, but just across from a small patch of firs which it occasionally visited. Area B had one male and possibly another. The total population may be placed at four pairs. Virginia Warblers find suitable habitat in associations of Gambel oaks, mountain mahogany, or open conifers in adjacent parts of Nevada and Arizona. Zonally these associations are classed either as high Upper Sonoran or low Transition. The warblers seem to require more ground cover and shrubbery than is usually present in a pure stand of piñons. On Clark Mountain there are neither oaks nor mountain mahogany and presumably for this reason the species is restricted to the vicinity of the firs. The specimens from Clark Mountain (males, nos. 77572, 77573) constitute the second reported breeding station for California. Previously they were known from the White Mountains of Inyo County.

Gray-headed Junco. *Junco caniceps caniceps*. One male, in full breeding condition (no. 77686) was taken on May 20 in the shadiest part of Area A as it sang rhythmically from a fir top. This part of the area had a good ground cover of currant and the litter of fir needles on the ground was fairly continuous locally and damp from recent snow. A singing male was observed in Area B on May 24 in a similar currant patch, but was not secured. No females were seen; they probably were occupied with incubation. The male from Clark Mountain is characteristic of *J. c. caniceps*, except for some pinkish color in the sides and is like certain of the birds from the Charleston range (see Miller, Condor, vol. 41, 1939, pp. 211-214). A more detailed treatment of the juncos of this region is included in a paper now in press.

A summary of population numbers for those species dependent upon the 40 acres of Transition Zone timber is as follows:

	Pairs
Hairy Woodpecker.....	1
Mountain Chickadee.....	3
Hermit Thrush.....	4
Mexican Bluebird.....	3
Virginia Warbler.....	4
Gray-headed Junco.....	2

Additional species of Boreal type which were detected in the firs were: Western Tanager (*Piranga ludoviciana*); Audubon Warbler (*Dendroica auduboni*); a single male Red-breasted Nuthatch (*Sitta canadensis*), no. 77468; a single female Evening Grosbeak (*Hesperiphona vespertina brooksi*), no. 77632; and Pine Siskin (*Spinus pinus pinus*), nos. 77644, 77645. Some of the tanagers may have stayed and bred and there may have been a pair of resident Audubon Warblers. Siskins were numerous and might have nested also, but the Evening Grosbeak and the nuthatch were undoubtedly vagrants.

An incongruous mixture of Upper Sonoran and Transition birds occurred at times in the firs as a result of the proximity of the piñon forest on all sides. Bush-tits and Western Gnatcatchers often crossed through parts of the areas and linnets sang from the cliffs above the juncos. Once a Scott Oriole stopped in a fir top to sing above the thickets where Hermit Thrushes were active. The Transition island with its precariously small populations of Boreal types was regularly washed over by the tide of Upper Sonoran species.

*Museum of Vertebrate Zoology, Berkeley, California, March 1, 1940.*



## FROM FIELD AND STUDY

**Varied Thrush Trapped by Acorn.**—On the day after last Thanksgiving (November 24, 1939)



Fig. 46. Varied Thrush with acorn on bill.

my wife and I were driving through thickly wooded hills on a road running between Ukiah and Mendocino, Mendocino County, California. There were numerous Varied Thrushes (*Ixoreus naevius*) flying away from the dirt road as we drove along. Stopping to investigate one which did not fly, we found it to be embarrassed by a large acorn which had become fastened on the bill with a sharp corner forced into one nostril. The bird was very weak, and, although it must have gone without food for some time, it managed to fly feebly off when we had cut the acorn free with a pair of scissors.—DAVID GELSTON NICHOLS, Berkeley, California, January 23, 1940.

**The Arctic Tern at Portland and Diamond Lake, Oregon.**—Records of the occurrence of Arctic Terns (*Sterna paradisaea*) in Oregon are so few and scattered that it seems appropriate to record a number of these birds seen in the State during the fall of 1939. On September 10, 1939, Mr. Harold Gilbert and a party of the Oregon Audubon Society, while observing birds on Sauvies Island, in the Columbia River, near Portland, saw and studied "about a dozen terns" at close range. On September 11, Mr. Gilbert gave the writer an excellent description of these birds, which checked with *paradisaea*. On the same day Mrs. Laura Bingham, a school teacher in Portland, brought me a dead immature *Sterna paradisaea* that one of her pupils had picked up dead on a vacant lot while on her way to school in the early morning. With this specimen in hand my tentative identification of the flock on Sauvies Island was strengthened.

During the period from September 25 to 29, 1939, while I was at Diamond Lake, at an elevation of 5,182 feet, in the Umpqua National Forest, Cascade Range, Oregon, terns were almost always in sight near the boat landing at the resort camp. As *Sterna forsteri* is a common summer resident at the nearby Klamath Lakes, little thought was given these birds until the morning of September 29, when just before leaving the locality I picked up a dead tern that had been recently shot by some thoughtless gunner. Much to my surprise, the bird proved to be an adult *Sterna paradisaea*.—STANLEY G. JEWETT, Portland, Oregon, November 27, 1939.

**Food Habits of Horned Owls in the Pahrangat Valley, Nevada.**—A nest of a Horned Owl, *Bubo virginianus* ssp. (*B. v. occidentalis* occurs in this locality according to Linsdale, Pac. Coast Avif. No. 23, 1936, p. 62), was found near the highway, about 4 miles south of Alamo, Lincoln County, Nevada, on May 16, 1939. Apparently the young had just left the nest since there was reasonably fresh prey present, including a cottontail (*Sylvilagus auduboni*). A dead fledgling owl, about a week old at the time of death, was picked up under the nest, and this, together with feathers and egg shells, served to identify the birds. The nest was a hole in a low cliff, and the site was in the Lower Sonoran desert, although within about 300 yards of the wet meadow lands which constitute the floor of Pahrangat Valley.

Two hundred and thirty-four whole pellets were picked up, all of them reasonably fresh. Most of them came from the ground below the nest, but a few from a wood rat (*Neotoma*) nest to which they had apparently been carried. The cliff contained only the one hole, so that there is no question as to the origin of the pellets. On examination, the pellets were found to contain remains of 407 prey items as shown in the table.

The pellets used in this study were examined separately, and any diagnostic element in a pellet was recorded as one individual prey item. This method gave higher counts of prey individuals by as much as 10 per cent than would have been obtained by the bulk method used by the author in a former investigation (Condor, vol. 41, 1939, pp. 54-61). Most of the discrepancy appears to be a result of the parents' tearing up prey and feeding parts of the same individual to different young, or to themselves and young. A smaller part of the discrepancy apparently results from loss of jaws or other bones in the cleaning process.



Chicken ticks (*Argas persicus*) occurred in several of the pellets. One pellet contained almost nothing but the skull of a pocket gopher and 42 ticks! I have no idea how so many ticks got into a pellet together with a normally tick-free animal. Four or five pellets each contained a large cocklebur (*Xanthium*) which probably had become attached to a mouse at the time of capture. No reptiles, amphibians or invertebrates (unless the ticks) were taken for food.

It is interesting to note that of the 378 individual mammals of species rather closely restricted either to a damp or to a dry habitat, 319, or 84.39 per cent, were inhabitants of the meadow land and only 59, or 15.61 per cent, were desert forms, although both habitats were equally available. Probably the number of suitable prey individuals is much greater in the meadow land, but there are no exact figures available. It is impossible to determine whether the owls hunted more hours over the meadows, or whether the difference in the percentages is a result of the different population densities only, or whether it is a combination of both factors.

In the vicinity of the nesting site, Ring-necked Pheasants (*Phasianus colchicus*) were common, and Gambel Quail (*Lophortyx gambelii*) and Mourning Doves (*Zenaidura macroura*) were very abundant. The fact that not so much as a feather of any of these was found at the nest would indicate that in this region during the nesting season the Horned Owl is entirely beneficial to man in its food habits.

Mammals		Number of items	Percentage of total items
Bat.....	<i>Lasiorycteris noctivagans</i> .....	1	.25
Pocket gopher.....	<i>Thomomys bottae</i> (centralis).....	32	7.86
Pocket mice.....	<i>Perognathus</i> sp. ....	1	.25
	<i>Perognathus longimembris</i> (panamintinus).....	5	1.23
	<i>Perognathus parvus</i> (olivaceus).....	1	.25
	<i>Perognathus formosus</i> (formosus).....	2	.49
Kangaroo rats.....	<i>Dipodomys</i> sp. ....	9	2.21
	<i>Dipodomys microps</i> .....	16	3.93
	<i>Dipodomys merriami</i> (merriami).....	2	.49
	<i>Dipodomys ordii</i> (fetus).....	1	.25
Harvest mouse.....	<i>Reithrodontomys megalotis</i> (megalotis).....	46	11.30
White-footed mice.....	<i>Peromyscus</i> sp. ....	8	1.97
	<i>Peromyscus maniculatus</i> (sonoriensis).....	6	1.47
Wood rats.....	<i>Neotoma</i> sp. ....	2	.49
	<i>Neotoma lepida</i> (lepida).....	20	4.91
Meadow mouse.....	<i>Microtus montanus</i> (fucosus).....	217	53.32
House mouse.....	<i>Mus musculus</i> .....	24	5.90
	Rodent (young) .....	1	.25
		394	96.81
Birds			
Rail.....	<i>Porzana carolina</i> .....	2	.49
Owl.....	<i>Bubo virginianus</i> (just hatched).....	1	.25
Swallow.....	<i>Stelgidopteryx serripennis</i> .....	1	.25
Bluebird.....	<i>Sialia currucoides</i> .....	1	.25
Wren.....	<i>Telmatoodytes palustris</i> ssp. ....	2	.49
Blackbirds.....	<i>Agelaius phoeniceus</i> (nevadensis).....	2	.49
	<i>Euphagus cyanocephalus</i> .....	1	.25
Sparrows.....	<i>Amphispiza belli</i> (nevadensis).....	1	.25
	<i>Zonotrichia leucophrys</i> ssp. ....	1	.25
	<i>Melospiza lincolni</i> ssp. ....	1	.25
		13	3.19
		407	100.00

The bat is a new record for Lincoln County. Parts of scientific names in parentheses are assumed on the basis of specimens collected in the vicinity by the Museum of Vertebrate Zoology, Berkeley, California.

My thanks are extended to Dr. E. Raymond Hall, of the Museum of Vertebrate Zoology, for the use of space and specimens, and to Drs. Seth B. Benson and Alden H. Miller of the same institution, who respectively, identified the bat and the sparrows for me.—R. M. BOND, *Soil Conservation Service, Berkeley, California, October 30, 1939.*

**An "Eagle Guard" Developed in Idaho.**—The Snake River valley of southern Idaho, largely desert in character, apparently serves as a wintering ground for many of the large avian predators. The Golden Eagle, Bald Eagle, Rough-legged Hawk, Red-tailed Hawk, and Swainson Hawk are all rather common in the area from the first of December to the last of March in normal years.

Since there are no trees except along the watercourses, perches are at a premium for these birds. They make use of the power lines that cross the area and thus constitute a factor in the interruption of service.

The field men of the Idaho Power Company have developed an "eagle guard," as shown in the accompanying photograph (fig. 47), which prevents birds from alighting on the cross arms. This installation is on the 20,000 volt line running from near Hagerman to Boise, a distance of about 100 miles. H. L. Senger, of the power company, informs me that some 3000 of these guards have been placed on poles on this line, at a cost of 10 cents a unit for materials and 10 cents a unit for installation.

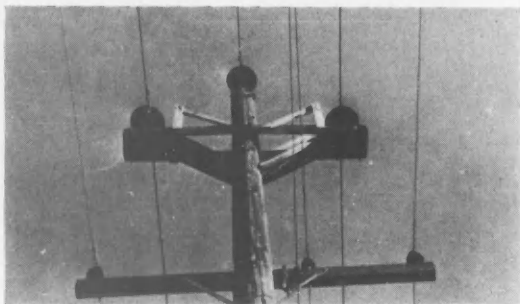


Fig. 47.—Eagle guard used on power line near Boise, Idaho.

The braces are made of two pieces of one-half by two inch boards cut to a standard size in the shops and nailed together at the peak. Nails are also driven into the ends in the shop, so that the lineman has only to place one end in position on the cross arm and drive the nail, then raise the other end into place and attach it. The installing is done without interrupting service, and is recommended only for those with steady nerves who are used to working around such equipment.

It is interesting to note that during the winters before the guards were installed, there were usually about fifty interruptions of service on this line on account of "shorting" by birds, in most instances eagles. These interruptions are now practically eliminated, with, of course, a considerable saving in bird life.

There are definitely localized areas where the birds cause trouble, which shift somewhat in different years. These shifts may correspond to changes in jackrabbit concentrations or other food factors, as the physical factors in the area must be fairly uniform from year to year.—WILLIAM H. MARSHALL, *Bureau of Biological Survey, Boise, Idaho, January 29, 1940.*

**Siberian Peregrine Falcon in North America.**—Recently I received a skin of a hawk collected on the Seward Peninsula, Alaska, near Cape Prince of Wales. I mentioned this, when I was in Washington, D. C., to my friend Major L. R. Wolfe and he at once requested that he be allowed to make an examination of the specimen. He has written to me under date of February 1, 1940, as follows: "It is identified as the Siberian Peregrine Falcon, *Falco peregrinus calidus*. A new form for North America is thus recorded. Dr. Herbert Friedmann, of the National Museum, examined the specimen with me and concurs in this identification. This form is characterized by less black on the cheeks, paler above and more white on underparts. As compared with three specimens of *Falco p. calidus* in the National Museum, of same sex, adult birds taken in winter and spring, your specimen is a counterpart in nearly every detail. When compared with the series of *Falco p. anatum*, the outstanding characters of *calidus* are: all upper parts much lighter, more slaty blue-gray, lacking the brownish color of the North American form; the throat, breast and belly are whiter and lack the buffy or fawn colored tinge; a third character is, you will note, that the black mustache mark on *calidus* extends down as an oblong marking while the white strip extends nearly to the eye (fig. 48).

This marking is very variable and should only be considered with other characters, but on most specimens of *anatum* the longitudinal strip is lacking and the white is only a slight indentation. Your bird, when compared with a series of Duck Hawks, can be picked out at a glance."



Fig. 48. Siberian Peregrine Falcon, showing black mustache and white strip.

Photo by J. E. McKinney.

My specimen was collected by a native on May 25, 1939, and is a male (fig. 49). It is no. 6483 in my collection.

I have a set of three eggs collected by the same man on Cape Mountain, June 12, 1935. It probably is that of the Siberian Peregrine Falcon. This set is no. 5476 in my collection.—WILSON C. HANNA, Colton, California, February 16, 1940.

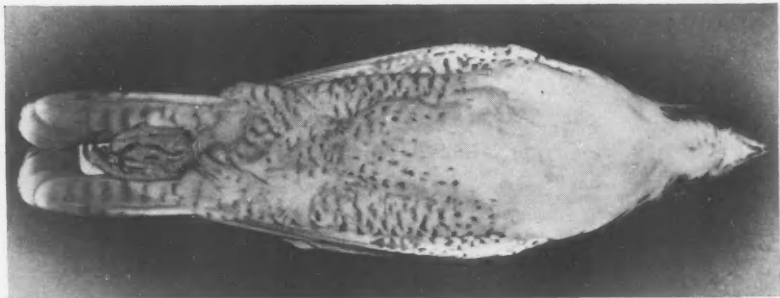


Fig. 49. Siberian Peregrine Falcon, taken May 25, 1939, near Cape Prince of Wales, Alaska.

**Bush-tit Nesting in Vicinity of Marshes.**—While investigating the nesting activities of Willow Goldfinches and Song Sparrows along the Sears Point cut-off, Napa County, near the Sonoma County line, California, on June 10, 1939, I came upon a Bush-tit (*Psaltirparus minimus*) nest about five feet off the ground in a broom bush. The nesting site seemed unusual in that it was probably eight or more miles to the nearest normal cover, and it did not seem that the nature of the broom growth along the ditch banks bordering the marshes would afford cover for permanent residence. The nest contained six fairly fresh eggs. Ducks, avocets, godwits, sandpipers, and other shorebirds are common in the immediate vicinity.—J. DUNCAN GRAHAM, *Benicia, California, February 12, 1940.*

**Food Habits of the White-tailed Kite.**—On June 12, 1939, Merle R. Gross, of the Soil Conservation Service, attempted to band a nest of young White-tailed Kites (*Elanus leucurus majusculus*) in a poplar at the edge of the Santa Clara River, Ventura County, California. The young were fully fledged and flew before they could be banded, but Mr. Gross found in the nest 26 pellets which he kindly turned over to me for analysis. Remains of 26 skulls of *Microtus* were found, one each in 22 pellets and two each in two others. The remaining two pellets contained only hair of the same mouse. The only meadow mouse known from this region is *M. californicus sanctidiegi*, which is doubtless the form represented. No other prey whatever was found in any of the pellets, though one contained a dry stick about 3 cm. long and .3 cm. thick. These findings agree closely with those in Santa Cruz County reported in the Condor (vol. 42, 1940, pp. 109-110) by Hawbecker. The kite nest was found by Mr. M. C. Badger of Santa Paula, to whom thanks are due for showing it to Mr. Gross.—R. M. BOND, *Soil Conservation Service, Berkeley, California, March 1, 1940.*

**Food of the Sharp-shinned Hawk.**—At Lac La Hache, British Columbia, in the summer of 1938, a pair of Sharp-shinned Hawks (*Accipiter velox*) built their nest in a tall spruce situated near the edge of a small spruce woods surrounded by open and brush-covered range. The structure was fourteen inches in diameter at the base, about six inches high and composed entirely of spruce twigs; it rested on two slender limbs that were close to the trunk and fifteen feet from the ground. Although I had passed close to the edge of the woods several times in July when the nest must have been occupied, it was not discovered until August 8 when my attention was attracted to it by a cloud of white down which, covering the nest and the surrounding branches, was conspicuous in the dark woods. This was identified later as the down shed by the young birds during the progression of the molt.

The adults had left the nesting territory, but three fully grown young, all females, remained in the vicinity. On the day the nest was discovered and on the two preceding days, they were heard calling from an adjacent timbered hillside, giving a rather mellow whistle, probably the call for food. These birds were feeding themselves.

The twigs composing the nest were gummed with droppings, and mixed through the structure and on the ground below were the feathers and other remains, including wings, of many small birds. Directly below the nest the ground was white with droppings.

In the thick woods forty yards away from the nesting tree numerous small birds had been plucked, probably by the male during the nesting period. The plucking place was a small dead willow lying in a horizontal position three feet above the forest floor. The ground below for a space of five feet by two feet was completely covered with feathers. The species identified here and in and about the nest were:

Sharp-tailed Grouse (*Pedioecetes phasianellus*), wing of young  
Sapsucker (*Sphyrapicus varius*)  
Flycatcher (*Empidonax* sp.)  
Long-billed Marsh Wren (*Telmatoodytes palustris*)  
Hermit Thrush (*Hylocichla guttata*)  
Mountain Bluebird (*Sialia currucoides*), ad. ♂, ♀  
Yellow Warbler (*Dendroica aestiva*), ad. ♂, ♀  
Audubon Warbler (*Dendroica auduboni*), ad. ♀, juv.  
Western Yellow-throat (*Geothlypis trichas*)  
Red-winged Blackbird (*Agelaius phoeniceus*), ad. ♀, juv. ♂  
Western Tanager (*Piranga ludoviciana*)  
Oregon Junco (*Junco oreganus*)  
Song Sparrow (*Melospiza melodia*)

The only food item other than birds was a red-backed mouse (*Clethrionomys gapperi*), indicated by pieces of skin and hair.

A number of pellets measuring from one-half inches to one and one-half inches long and one-half inch wide was collected, eleven from the nest and eight from the plucking place; the contents of these were as follows:

One consisted of 95 per cent red-backed mouse hair and 5 per cent feathers; another comprised 95 per cent feathers and 5 per cent red-backed mouse hair; the remainder was composed of feathers (chiefly contour feathers) and, in four instances, pieces of bird bones. Fragments of the elytra of small beetles were present in the majority and seeds occurred in two; these were considered to be from the digestive tracts of the small birds eaten.

The feathers were broken down and for the most part without color or other characters by which they might be identified. Three pellets contained red feathers that might have been from a Red-winged Blackbird; another, red feathers that suggested a sapsucker; and a third, yellow feathers that might represent any one of several species.

The three young Sharp-shinned Hawks were collected; the stomach of one contained parts of a Red-winged Blackbird; that of another, a Shufeldt Junco. The stomach of the third was empty.—J. A. MUNRO, *Okanagan Landing, British Columbia, January 29, 1940.*

**The House Finch in Western Oregon.**—In the *Condor* (vol. 41, 1939, p. 164), Kenneth Gordon reports the House Finch (*Carpodacus mexicanus frontalis*) at Corvallis, Benton County, Oregon, during April, 1937, and states "In the past it has not been recorded . . . north of the Rogue and Umpqua river valleys."

I wish to report a female, no. 7177 in my collection, taken at Forest Grove, Washington County, Oregon, on March 21, 1932. During a recent visit to the DePoe Bay Museum, I examined a mounted female taken at South Beach, Yaquina Bay, Lincoln County, on January 6, 1938, by Mr. J. C. Braly. On September 11, 1939, I visited with Mr. Braly the exact locality where he had taken his specimen. A flock of eleven of these birds was found feeding in a dense growth of bush lupine along the old ferry road near the beach. An adult male and an immature female were collected. Others of the same species were heard in the nearby trees. From these observations it would appear that during recent years the House Finch has moved northwest into the humid coastal region of Oregon.—STANLEY G. JEWETT, *Portland, Oregon, October 11, 1939.*

**New and Noteworthy Records of Birds for the State of Nevada.**—The following notes pertain to kinds of birds not commonly recorded from western Nevada. Unless otherwise noted observations were made and specimens were taken by the writer.

*Butorides virescens anthonyi*. Anthony Green Heron. One was obtained four miles west of Fallon, Churchill County, in September, 1934; this was the only one seen in this location. Two others were seen, and both obtained (nos. 77798, 77799, Mus. Vert. Zool.), five miles southeast of Minden on the Carson River, Douglas County, on August 24, 1939. This species is reported (Linsdale, Pac. Coast Avif. No. 23, 1936, p. 31) from the Colorado River valley, but has not been previously reported in western Nevada.

*Isobrychus exilis hesperis*. Least Bittern. One was taken (coll. J. R. Alcorn) by Earl J. Alcorn, four miles west of Fallon, in September, 1935. This was the only one seen.

*Anser albifrons*. White-fronted Goose. One was obtained by Vernon L. Mills (coll. Mrs. Anna Bailey Mills) near Soda Lake, Churchill County, on April 3, 1938. No others were seen. This is the first record of this species in western Nevada.

*Querquedula discors*. Blue-winged Teal. One male was obtained by Vernon L. Mills, at Mahala Slough, Churchill County, on April 1, 1939 (coll. Mrs. Anna Bailey Mills). No others were seen. Although this teal has been recorded from Nevada a few times, Mr. Mills and I had vainly attempted to obtain or see a "blue-wing" for over six years.

*Aix sponsa*. Wood Duck. One was obtained four miles west of Fallon in December, 1933 (coll. R. T. Moore); one was obtained on Carson Lake, Churchill County, in November, 1937 (coll. J. R. Alcorn); one was seen to fly from Wilson Creek, 7500 feet, Nye County, in October, 1937, and Vernon L. Mills observed two on a canal seven miles west of Fallon on October 14, 1939. This species of duck has not otherwise been recorded in Nevada in recent years.

*Nyroca marila*. Greater Scaup Duck. One was taken by Vernon L. Mills (coll. Wm. A. Powell, Jr.) near Soda Lake, Churchill County, on November 20, 1938. No others were seen.

*Lophodytes cucullatus*. Hooded Merganser. One male was taken four miles southwest of Wadsworth on the Truckee Canal, Storey County, in December, 1937 (coll. J. R. Alcorn). One female was seen with this male.

*Accipiter atricapillus*. Goshawk. One in immature plumage was taken five miles southwest of Fallon, Churchill County, in March, 1937 (coll. J. R. Alcorn). An adult male was taken by Vernon

L. Mills in the same location on February 20, 1935 (coll. Mrs. Anna Bailey Mills). These two specimens were taken among a dense growth of brush and cottonwood trees.

*Haliaeetus leucocephalus leucocephalus*. Southern Bald Eagle. One adult was seen perched on a limb of a dead tree which stood in the water of Lehonton Reservoir, in December, 1935. An adult was seen flying overhead six miles northeast of Fallon, Churchill County, in February, 1939, and an adult was seen perched in a cottonwood tree, two miles northwest of Soda Lake, Churchill County, on February 25, 1940.

*Gallinula chloropus cachinnans*. Florida Gallinule. One adult (coll. Mrs. Anna Bailey Mills) was obtained by Vernon L. Mills near Soda Lake, Churchill County, on July 15, 1928. This species has not previously been reported as having been collected in Nevada.

*Limosa fedoa*. Marbled Godwit. One was taken in Rattlesnake Reservoir, Churchill County, in December, 1938 (coll. Wm. A. Powell, Jr.); seven others were seen. I have on numerous occasions, in the past two years, seen a few of these birds in the Fallon area.

*Larus argentatus*. Herring Gull. One female, not in adult plumage, was obtained by Earl J. Alcorn at the north end of Walker Lake, Mineral County, on November 13, 1939 (no. 79012, Mus. Vert. Zool.). It was seen flying overhead in company with an adult of the same species. This gull has not previously been recorded from the state.

*Larus philadelphia*. Bonaparte Gull. Two specimens were taken at Soda Lake, Churchill County, on November 22, 1938. Ten others were seen flying over the lake. Two specimens were obtained at the same place on May 6, 1936, from a flock of eight (nos. 76191 and 76192, Mus. Vert. Zool.). This species was observed by Vernon L. Mills near Soda Lake, Churchill County, on the following dates: May 2, 1931; September 28, 1938; October 7, 1939. The number seen varied from five to fifteen. This species of gull has not before been reported from western Nevada.

*Cryptoglaux acadica acadica*. Saw-whet Owl. One was found dead four miles west of Fallon, Churchill County, in December, 1935; another in the same locality was found dead in January, 1937 (coll. R. T. Moore). I was unable to determine what had killed them. Another was discovered in a juniper tree near Eastgate, Churchill County, in December, 1938. When the tree was struck by an ax I heard a noise, but could not locate the source until I struck the tree again, and in response to the continued scolding looked into the tree. There, about on a level with my head was the owl, perched on a limb close to the trunk of the tree. The bird allowed me to bring my hand slowly to within six inches of it before it flew to alight in another tree thirty feet away.

*Nannus hiemalis pacificus*. Western Winter Wren. A solitary bird (no. 76193, Mus. Vert. Zool.) was taken four miles west of Fallon, Churchill County, on April 5, 1939. This is the third record of the bird in Nevada.

*Quiscalus quiscula aeneus*. Bronzed Grackle. One was found dead four miles west of Fallon, Churchill County, on April 14, 1938. This bird was given to Mrs. Anna Bailey Mills who agreed with me as to the identification of the species. She intended to prepare it as a skin but the bird was "slipping" and therefore discarded. It was found dead along with about nine blackbirds that had apparently been killed with poisoned rolled oats that were distributed in the area for ground squirrels.

*Spizella arborea ochracea*. Tree Sparrow. One was taken by Earl J. Alcorn four miles west of Fallon, Churchill County, on November 25, 1939 (no. 77276, Mus. Vert. Zool.). No other individuals were seen.

*Zonotrichia coronata*. Golden-crowned Sparrow. One was seen and taken four miles west of Fallon, Churchill County, on April 30, 1936. No other individuals of this species have been seen by me in Nevada.—J. R. ALCORN, *Museum of Vertebrate Zoology, Berkeley, California, February 8, 1940.*

**Wood Ducks in Solano and Napa Counties, California.**—Wood Ducks (*Aix sponsa*) have increased in abundance in favorable areas along creeks in Napa and Solano counties to such an extent that I felt justified in adding a pair of them to my collection of birds of this region. This pair was taken December 13, 1938, from the oak area along Ledgewood Creek near Manka, Solano County, at about the boundary line with Napa County. Both birds had been feeding on acorns, the crop of the male holding eight entire and full-grown acorns from a live oak (*Quercus agrifolia*).—EMERSON A. STONER, *Benicia, California, August 23, 1939.*

**Eared Grebe at Yakutat, Alaska—A Correction.**—In "The Summer Birds of Yakutat Bay, Alaska" (Contr. Royal Ontario Mus. Zool., No. 17, 1939) I recorded the Eared Grebe, *Colymbus nigricollis*, as a common migrant at Yakutat. This is an error. The account should refer to the Horned Grebe, *Colymbus auritus*. This and *Colymbus grisegena* were the only grebes observed at Yakutat. This correction is made with regrets and apologies for the lapse which allowed the recording of the wrong species.—T. M. SHORTT, *Royal Ontario Museum of Zoology, Toronto, March 18, 1940.*

## NOTES AND NEWS

Mr. A. C. Bent reports that steady progress is being made in producing his series of volumes on life histories of North American birds. The thirteenth volume, containing the remaining non-passerine birds, from parrots to hummingbirds on the old Check-list, is now in type and should be published in the near future. The fourteenth volume, containing the flycatchers, horned larks and swallows, is now nearly done and should go to the publishers before summer. The author is starting work on the fifteenth volume, which is to contain the Corvidae and the Paridae in the order of the new Check-list. This notice is to remind past and future contributors to this co-operative work that Mr. Bent is ready to receive contributions of notes, data and photographs, relating to birds in these groups. He wishes to thank his many friends for their help in the past and looks forward with pleasure to future cooperation.

A major event in Pacific coast ornithology is the publication of "The Birds of Oregon," by Ira N. Gabrielson and Stanley G. Jewett. Our copy was received on April 26, 1940. It is a book sponsored by Oregon State College, Corvallis, consisting of xxx+650 pages, with 97 plates, 20 text figures (maps), a colored frontispiece, and a folded life-zone map. No section of the western United States has had more need for a general book on its bird life than Oregon. The "Birds of Oregon" is designed in part as a text for the beginning student in that it contains introductory sections on birds in general that are of distinctly elementary stamp. These, with the descriptions of species quoted from Mrs. Bailey's handbook, should serve this purpose in adequate, though not distinguished, fashion. But, the book's major contribution lies in its value to the somewhat more advanced student of birds who is concerned with distributional problems in Oregon. The authors are eminently qualified to discuss occurrence, seasonal status, abundance, and habits of species in the State, and they do so interestingly and accurately. Wisely, for a book of this kind, they deviate in no significant degree from the nomenclature of the A. O. U. Check-list. There is no extended attempt at nomenclatural or systematic revision. Thus, none of the many subspecies described by Oberholser in 1932 from the Warner Valley area is accounted for, except that they are included with the list of species with type localities in Oregon. As explained in the introduction, the manuscript was completed in 1935, and we note that not all records published by the authors themselves subsequent to that year are incorporated. This does

not appear to us a serious deficiency, however. The illustrations are from photographs by the authors and by William L. Finley, Irene Finley, H. T. Bohlman, Alex Walker and Reed Ferris. These greatly enhance the value and beauty of the book which is nicely printed and bound. Every serious student of birds will prize this work and will be grateful to the authors for the excellent compilation which it comprises.—A. H. M.

## MINUTES OF COOPER CLUB MEETINGS

## SOUTHERN DIVISION

JANUARY.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held at the Los Angeles Museum on Tuesday, January 30, 1940, at 7:30 p.m., with President Peyton in the chair and approximately one hundred and twenty members and guests present.

The minutes of the December meeting of the Southern Division were approved as read. Sixteen applications for membership were read as follows: Floyd Garfield Ashbaugh, 1961 Eden Ave., Glendale, Calif.; Ira Brooks Boggs, Ogelbay Hall, Morgantown, W. Va.; Charles T. Church, 70 Pine St., New York, N. Y.; Louie Irby Davis, Harlingen, Texas; E. Raymond Driver, P. O. Box 1114, Medford, Ore.; Jos. L. Floyd, Court House, Canton, Ohio; Devin A. Garrity, 23 East 26th St., New York, N. Y.; Lucy Bell Hawk, 219 N. Calaveras St., Fresno, Calif.; Magdeleine C. Hutchinson (Mrs. Arthur E.), Chester Springs, Chester Co., Pa.; Pompeo M. Maresi, 9 Reimer Road, Scarsdale, N. Y.; John L. Miller, 2349 West 23rd St., Los Angeles, Calif.; Edward H. Moeran, 541 Bronx River Road, Yonkers, N. Y.; and Almeda Nordyke, 2745 C St., Selma, Calif., all proposed by W. Lee Chambers. John Courts Jones, 3224 19th St., N.W., Washington, D. C., and Captain G. E. Thomas, U. S. Naval Training Station, San Diego, Calif., by John McB. Robertson; Hobart Merritt Van Deusen, 128 Pinehurst Ave., New York, N. Y., by Mrs. N. Edward Ayer.

President Peyton called for the report of the nominating committee. The chairman, Mr. George Willett, offered the following nominations for 1940: President, Robert T. Moore; Vice-president, Hildegard Howard; Secretary, Sherwin F. Wood. It was moved and seconded that the secretary cast a unanimous ballot for the slate as presented and the new officers were duly installed.



Mr. George Willett reported a new publication of the U. S. Biological Survey on birds and mammals of eastern Oregon entitled "Hart Mountain Antelope Refuge" by Stanley G. Jewett, who was introduced to the members.

Mr. Sidney Peyton reported seeing four Dusky Poor-wills in Sespe Canyon at dusk on January 27th.

Mr. George Willett reminded members of the Annual Meeting to be held at the Los Angeles Museum on March 22 and 23. Friday and Saturday will be devoted to presentation of papers with possibly a field trip on Sunday. The Annual Dinner will be held Saturday night, March 23.

A resolution nominating William Alanson Bryan, of Los Angeles, California, to Honorary membership in the Cooper Club was passed unanimously by the Southern Division "in recognition of his many contributions to the science of ornithology, and of the many courtesies he has extended to the Cooper Ornithological Club of California." A letter bearing this resolution was forwarded to the President of the Northern Division.

President Moore suggested that the Southern Division send a message of congratulation and good wishes to the Delaware Valley Ornithological Club of Philadelphia, Pa., this year being its Fiftieth Anniversary. A motion to this effect by Dr. Louis B. Bishop was seconded and unanimously carried.

A motion expressing appreciation for the splendid services of the officers of 1939, especially Mr. Sidney Peyton, initiated by Mr. C. V. Duff, was seconded and unanimously carried. Dr. Bishop further commented on the efficiency of two outstanding secretaries of the club, Laura Law Bailey and Hildegard Howard.

The program of the evening consisted of motion pictures in color illustrating life history studies of the Golden Eagle, Bald Eagle, Pacific Horned Owl, Red-bellied and Cooper hawks, Great Blue Heron, and "Birds of the Sierras," namely Junco, Modoc Song Sparrow, White-headed Woodpecker and Golden Pileolated Warbler. Mrs. F. F. Roberts assisted in taking the pictures of the "Birds of the Sierras." The color quality was excellent and the artistic photography of the narrator, Mr. Ed. N. Harrison, well deserved the enthusiastic applause of the club members.

Adjourned.—SHERWIN F. WOOD, *Secretary*.

#### NORTHERN DIVISION

FEBRUARY.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, February 29, 1940, at 8:00 p.m., in room 2503 Life Sciences Building, Berkeley, with President Painton in

the chair, and about 60 members and guests present. Minutes of the Northern Division for January were read and approved. Minutes of the Southern Division were read by title only. Names proposed for membership were: Miss May Titus, 2510 Bancroft Way, Berkeley, by David G. Nichols; Edwin Price Weigel, 709 Elmwood Ave., Wilmette, Illinois, by Alden H. Miller. A resolution nominating William Alanson Bryan, of Los Angeles, California, to Honorary Membership in the Club, was given its first reading before the Northern Division.

Mrs. Grinnell announced that the Pacific Northwest Bird and Mammal Society would meet with the A.A.A.S. in Seattle, Washington, June 17-22, and that the Cooper Club had been invited to participate. It was moved and carried that the president appoint a delegate from the Northern Division. Attention was called to the 14th Annual Meeting of the Cooper Club, to be held at the Los Angeles Museum, March 22-24.

Field notes opened with B. C. Cain's account of the feeding of cormorants on fish, near the underpass at the Berkeley Aquatic Park, during incoming tide, February 8th. Bonaparte Gulls were taking advantage of the situation for their own feeding. Mr. Durham reported briefly on the status of waterfowl at Point Isabel, since the establishment of the duck club. Mr. Moffitt described the northward migration of flocks of Whistling Swans, to escape bad weather conditions in Lassen County around February 23.

Mr. Carl Koford, speaker of the evening, gave an excellent account of the Natural History of the California Condor, which he has been studying in the field under the auspices of the National Association of Audubon Societies. In this work he has cooperated closely with J. R. Pemberton, whose photographic records of the birds are unequalled. By way of introduction, Mr. Koford outlined something of the previous knowledge concerning the Condor, numbers of museum specimens, records of birds kept in captivity, popular ideas as to its size, etc. External appearance and field characters were illustrated by a few still photographs, including the classical ones by Finley and Bohlman. Roosting postures and the elaborate exercises in preparation for flight Mr. Koford presented graphically by rapid chalk sketches. The typical soaring flight was described in detail. Feeding and drinking habits, it was explained, are closely related to the problem of preservation of the species. The suggestion was hazarded that overspecialization might be leading inevitably to extinction. It is toward a more complete understanding of the ecology of these birds, and the discovery of possible means for their preservation, that this study is directed.

Adjourned.—FRANCES CARTER, *Recording Secretary*.



**OFFICERS AND MEMBERS**  
OF THE  
**COOPER ORNITHOLOGICAL CLUB,**  
INCORPORATED

Revised to April 25, 1940

**OFFICERS OF THE CORPORATION**

Howard Robertson.....	President
Alden H. Miller.....	Senior Vice-President
J. S. Cooper.....	Junior Vice-President
George Willett.....	Secretary
Hilda W. Grinnell.....	Assistant Secretary
John McB. Robertson.....	Treasurer
W. Lee Chambers.....	Business Manager
Alden H. Miller.....	Editor
Jean M. Linsdale.....	Associate Editor

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**DIVISION OFFICERS**

**NORTHERN DIVISION**

Harry R. Painton.....	President
E. Lowell Sumner, Jr.....	Vice-President
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**SOUTHERN DIVISION**

Robert T. Moore.....	President
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**MEMBERSHIP DIRECTORY**

Year following address indicates date of election to membership. Year in parentheses indicates date of advancement to Honorary or Life Membership. [L.] = Life Member.

**A**

Abbott, Clinton G., Nat. Hist. Museum, Balboa Park, San Diego, Calif. 1921.
Abernathy, Mrs. Frieda, 2226 McGee Ave., Berkeley, Calif. 1939.
Adams, Mrs. E. L., 1712 Milan Ave., South Pasadena, Calif. 1936.
Adams, Lowell, Calif. Forest and Range Experiment Sta., care Kings River Camp, Trimmer Route, Sanger, Calif. 1939.
Albro, Miss Mary Stephanie, 51 Canyon Road, Berkeley, Calif., 1927.
Alcorn, J. R., Museum of Vertebrate Zoology, Berkeley, Calif. 1939.
Aldrich, Elmer C., 6532 Pinehaven Road, Oakland, Calif. 1935.
Alexander, Miss Annie M., The Regillus, 19th and Jackson Sts., Oakland, Calif. 1908 (1923). [L.]
Alexander, Donald Child, 18 Hurd St., Lowell, Mass. 1939.
Allan, Philip Farley, 806 Bellview St., Amarillo, Texas. 1939.
Allen, Mrs. Amelia S., 37 Mosswood Road, Berkeley, Calif. 1913.
Allen, Dr. Arthur A., Fernow Hall, Ithaca, N. Y. 1911.
Allen, Walter I., 2057 Pepper Drive, Altadena, Calif. 1922.
Alpert, Bernard, 170 Broadway, New York, N. Y. 1939.
Ambler, Marjorie W. (Mrs. A. C.), 1110 Baldwin St., Arcadia, Calif. 1940.
Anderson, A. H., Rt. 5, Box 488, Tucson, Ariz. 1932.
Anderson, Dr. Rudolph M., Biol. Div. National Museum of Canada, Ottawa, Ontario, Canada, 1916.
Andrews, Arthur Allen, P. O. Box 199, Main Office, Rochester, N. Y. 1927.
Applegarth, John H., 2591 South Court, Palo Alto, Calif., 1937.
Applegate, Elmer I., Dudley Herbarium, Stanford University, Calif. 1921.
Appleton, J. S., R. F. D., Simi, Calif. 1901 (1919). [L.]
Arnold, Dr. John R., Stockton Junior College, Stockton, Calif. 1930.
Arnold, Dr. Ralph, 812 Subway Terminal Bldg., Los Angeles, Calif. 1893.

- Arvey, Martin Dale, Dept. of Zoology, Univ. of Idaho, Moscow, Idaho. 1937.
- Ashbaugh, Floyd Garfield, 1961 Eden Ave., Glendale, Calif. 1940.
- Ashley, James F., 740 Santa Clara Ave., Alameda, Calif. 1933.
- Atkinson, Dr. Spencer R., 90 Madison Ave., Pasadena, Calif. 1925.
- Atkinson, W. L., 105 S. 14th St., San Jose, Calif. 1925.
- Atsatt, Miss Sarah R., 405 Hilgard Ave., Los Angeles, Calif. 1911.
- Austin, Mrs. Enid K., 541 Boulevard Way, Piedmont, Calif. 1939.
- Austin, Oliver L., M.D., Tuckahoe, Westchester Co., N. Y. 1930.
- Austin, Oliver L., Jr. Wellfleet, Cape Cod, Mass. 1933.
- Austin, Paul G., 1508 N. Los Robles Ave., Pasadena, Calif. 1934.
- Ayer, Mrs. N. Edward, 1300 Hillcrest Drive, Pomona, Calif. 1929.
- B
- Bach, Robert S., 404 U. S. Court House, Portland, Ore. 1937.
- Badger, M. C., Rt. No. 1, Box 98, Santa Paula, Calif. 1915.
- Bailey, Alfred M., Museum Nat. Hist., Denver, Colo. 1917.
- Bailey, Florence M. (Mrs. Vernon), 1834 Kalorama Road, N. W., Washington, D. C. 1910 (1920) [L.] (1920) [Honorary].
- Bailey, H. H., 820 Alhambra Circle, Coral Gables, Fla. 1903.
- Bailey, Laura B. (Mrs. H. H.), 820 Alhambra Circle, Coral Gables, Fla. 1915 (1920) [L.]
- Bailey, Vernon, 1834 Kalorama Road, N. W., Washington, D. C. 1904.
- Baker, John H., 1006 Fifth Ave., New York, N. Y. 1930.
- Ball, Wm. Howard, 1861 Ingleside Terrace, Washington, D. C. 1926.
- Ballard, Albert, 722 N. Harrison St., Stockton, Calif. 1929.
- Bamford, Mrs. G. L., 1428 Castro St., Oakland, Calif. 1918.
- Barnes, Dale K., 1102 Neilson St., Albany, Calif. 1939.
- Barnes, R. Magoon, Lacon, Ill. 1908 (1921). [L.]
- Barr, William F., 1606 53rd St., Oakland, Calif. 1938.
- Barry, Miss Margaret A., 6928 Templeton St., Huntington Park, Calif. 1937.
- Bartholomew, Paul S., 324 N. Michigan Ave., Glendora, Calif. 1939.
- Bassett, Frank N., 722 N. Orange Drive, Los Angeles, Calif. 1919.
- Batchelder, Chas. F., 7 Kirkland St., Cambridge, Mass. 1910.
- Bates, Miss Josephine J., 240 E. Montana St., Pasadena, Calif. 1921.
- Battles, Carroll David, 2347 S. Highland Ave., Los Angeles, Calif. 1924.
- Baumgardt, John, 143 N. McCadden Place, Los Angeles, Calif. 1937.
- Beck, Rollo H., Planada, Merced Co., Calif. 1894 (1919). [L.]
- Beebe, William, 33 West 67th St., New York, N. Y. 1926.
- Behle, Dr. William Harroun, Dept. of Biology, Univ. of Utah, Salt Lake City, Utah. 1933.
- Bell, Archibald Weir, 365 S. Hoover St., Los Angeles, Calif. 1936.
- Bello, Alice M. (Mrs. Victor), 617 Fifth Ave., San Rafael, Calif. 1937.
- Belt, Bruce G., 2200 Live Oak Drive, Los Angeles, Calif. 1940.
- Bene, Frank, 2242 West Madison St., Phoenix, Ariz. 1940.
- Benjamin, Gilbert G., Jr., 2297 W. 23rd St., Los Angeles, Calif. 1939.
- Bennett, Logan Johnson, Zool. Dept. Iowa State College, Ames, Iowa. 1936.
- Bennett, Walter W., 1254 West 41st Place, Los Angeles, Calif. 1934.
- Benson, Dr. Seth Bertram, Museum Vertebrate Zoology, Berkeley, Calif. 1927.
- Bent, A. C., 140 High St., Taunton, Mass. 1909 (1922) [L.] (1933) [Honorary].
- Betterley, Bertram O., 2005 2nd St., Eureka, Calif. 1922.
- Bickford, E. L., 1938 Laurelwood Lane, Napa, Calif., 1927-34, 1939.
- Bigelow, Homer L. The Farm, Windy Row, Peterboro, N. H., 1910.
- Birchett, Mrs. Joseph T., 202 E. 7th St., Tempe, Arizona. 1940.
- Birkhead, Robert H., 1121 Kilson Drive, Santa Ana, Calif. 1928.
- Bishop, Dr. Louis B., 450 Bradford St., Pasadena, Calif. 1904 (1920). [L.]
- Blain, Dr. Alexander W., 2201 Jefferson Ave., Detroit, Mich. 1926.
- Blanchard, Miss Barbara D., Placer Junior College, Auburn, Calif. 1930.
- Blanchard, Dean Hobbs, 1029 Poli St., Ventura, Calif. 1937.
- Blanks, Herbert Beverly, Sequoia National Park, Calif. 1933.
- Blayne, Miss Nita A., 920 O St., Fresno, Calif. 1911.
- Blickensderfer, Clark, 866 Grant St., Denver, Colo. 1922.
- Bobbert, Mrs. Aniva H., 308 Chestnut Ave., Palo Alto, Calif. 1939.
- Boggs, Ira Brooks, Oglebay Hall, Morgantown, West Virginia. 1940.

- Bolander, L. Ph., 464 Fair Oaks Ave., San Francisco, Calif. 1907.
- Bolt, Benj. F., 5300 Brookside Blvd., Kansas City, Mo. 1916.
- Bond, Dr. Richard M., 2223 Fulton St., Berkeley, Calif. 1936.
- Booth, Ernest S., Dept. of Biology, Walla Walla College, College Place, Wash. 1939.
- Borell, Adrey E., Soil Conservation Service, P. O. Box 227, Albuquerque, New Mexico. 1918.
- Bosbyshell, F. H., 829 North Occidental Blvd., Los Angeles, Calif. 1940.
- Boulton, Rudyerd, Field Museum, Chicago, Ill. 1939.
- Boulware, Jean T., Apt. 303, 2510 Bancroft Way, Berkeley, Calif. 1939.
- Bowdish, B. S., Demarest, N. J. 1910.
- Boyers, L. Morgan, 1014 Mariposa Ave., Berkeley, Calif. 1931.
- Boyle, Ashby D., 61 University Ave., Salt Lake City, Utah. 1915.
- Bracelin, Mrs. H. P., 2214 Vine St., Berkeley, Calif. 1930.
- Bradley, Mrs. Elizabeth, 527 Mountain View Ave., San Bernardino, Calif. 1938.
- Brady, J. C., De Poe Bay, Ore. 1926.
- Brandreth, Courtenay, Ossining, New York. 1925.
- Brandt, H. W. 11945 Carleton Road, Cleveland, Ohio, 1914.
- Brode, J. Stanley, Santa Monica Junior College, Santa Monica, Calif. 1934.
- Brodkorb, Pierce, Museum of Zoology, Ann Arbor, Mich. 1940.
- Brooks, Major Allan, Okanagan Landing, B. C., Canada. 1906 (1920) [L.] (1936) [Honorary].
- Brooks, Prof. Sumner C. Dept. Zool., Univ. Calif., Berkeley, Calif. 1928.
- Brooks, William E., 4008 North 7th St., Phoenix, Ariz. 1940.
- Brown, Asa L., Litchfield, Calif. 1938.
- Brown, Harrison, Hornby Island, B. C., Canada. 1938.
- Brown, Miss Nellie May, 10361 Fernglan Ave., Tujunga, Calif. 1922.
- Bryan, William A., 142 South Hayworth Ave., Los Angeles, Calif. 1921 (1940) [Honorary].
- Bryant, Charles A., 2650 Franklin St., San Francisco, Calif., 1922.
- Bryant, Dr. Harold C., Grand Canyon National Park, Arizona. 1910 (1920). [L.]
- Bryant, Monroe D., Box 866, Kerrville, Texas. 1939.
- Bryens, Oscar McKinley, McMillan, Luce Co., Mich. 1927.
- Buchanan, Miss Kathryn, Rural Route A, Clovis, New Mexico. 1937.
- Buckalew, Herbert, 120 Marshall St., Milford, Delaware. 1936.
- Buckman, George, 47 Bonnie Lane, Berkeley, Calif. 1927.
- Budd, Edward, 1511 Durant St., Santa Ana, Calif. 1940.
- Buhn, Mrs. Minnie, 2070 Charlene Ave., Hayward, Calif. 1921.
- Bunker, Paul F., 717 Spruce St., Berkeley, Calif. 1922.
- Bupp, Mrs. Mildred, 240 Maiden Lane, Montecello, Calif. 1936.
- Burleigh, Thomas D., 400 Union Bldg., 837 Gravier St., New Orleans, La. 1918.
- Burleson, Mrs. Donald, Box 262, Pacific Palisades, Calif. 1935.
- Burnham, Dr. Clark, 853 Arlington Ave., Berkeley, Calif. 1907.
- Burns, Frank L., Berwyn, Penn. 1909.
- Burt, Dr. William Henry, Museum of Zoology, Univ. of Michigan, Ann Arbor, Mich. 1928.
- Burtch, Verdi, Branchport, N. Y. 1910.

## C

- Cahalane, Victor H., Section on National Park Wildlife, Division of Wildlife Research, Bureau of Biological Survey, Washington, D. C. 1938.
- Cain, Brighton C., P. O. Box 796, Oakland, Calif. 1925.
- Calder, James A., Buena Park, Calif. 1917.
- Calder, Mrs. James A., Buena Park, Calif. 1926.
- Cameron, Allan D., 670 Williams Court, Sacramento St., Altadena, Calif. 1937.
- Camp, Dr. Charles L., Mus. Paleontology, Univ. Calif., Berkeley, Calif. 1909.
- Campbell, Dr. Berry, Dept. Anatomy, Univ. Okla. Medical School, Oklahoma City, Okla. 1930.
- Cantwell, George G., 3602 Keystone Ave., Palms, Calif. 1915.
- Carey, Josh Harlan, Willis Sweet Hall, Moscow, Idaho. 1936.
- Carpenter, Mrs. Fred A., 1616 Sonoma Ave., Berkeley, Calif. 1930.
- Carpenter, Nelson K., 5014 Westminster Terrace, San Diego, Calif. 1901.
- Carriger, Henry W., 5185 Trask St., Oakland, Calif. 1895.
- Carter, Miss Frances, 1626 LeRoy Ave., Berkeley, Calif. 1934.
- Carter, John H., Sod House Camp, B. F. No. 2, Burns, Ore. 1936.
- Chadwick, Perley C., 426 W. Olive Ave., Redlands, Calif. 1939.
- Chambers, Carl William, 1247 Lincoln Blvd., Santa Monica, Calif. 1936.
- Chambers, W. Lee, 2068 Escarpa Drive, Eagle Rock, Calif. 1897 (1919) [L.] (1936) [Honorary].
- Chapman, Dr. Frank M., Amer. Museum Nat. Hist., New York, N. Y. 1903.
- Chattin, Miss Susan E., Museum Vert. Zool., Univ. Calif., Berkeley, Calif. 1927.

- Christy, Bayard H., 403 Frederick Ave., Sewickley, Penn. 1928.
- Church, Charles T., 70 Pine St., New York, N. Y. 1940.
- Clabaugh, Ernest Dwight, 44 Lenox Road, Berkeley, Calif. 1923 (1934). [L.]
- Clark, Prof. Harold W., Angwin, Napa County, Calif. 1925.
- Clary, Mrs. Ben Little, Coral Reef Ranch, Coachella, Calif. 1929.
- Clay, C. Irvin, Box 353, Eureka, Calif. 1910.
- Coble, Mary Ferguson, 3400 San Marino, Los Angeles, Calif. 1940.
- Cockefair, Miss Ellen A., 4021 Howe St., Oakland, Calif. 1925.
- Coggins, Herbert L., 1157 Filbert St., San Francisco, Calif. 1910.
- Cogswell, Howard Lyman, 2420 W. Grand Ave., Alhambra, Calif. 1940.
- Cohen, Donald A., 22728 Bay View Ave., Hayward, Calif. 1901.
- Colburn, A. E., 3100 Wilshire Blvd., Los Angeles, Calif. 1905 (1915). [L.]
- Cole, Elliot, Rt. 1, Box 74, Pasadena, Calif. 1929.
- Coleman, Shirl, Box 254, Faculty Exchange, College Station, Texas. 1939.
- Colton, Dr. Harold S., Museum of Northern Arizona, Flagstaff, Ariz. 1936.
- Comby, Julius H., 256 N. Walnut St., Pico, Calif. 1939.
- Compton, Lawrence V., Soil Conservation Service, Box 1348, Albuquerque, New Mexico. 1927.
- Comstock, Dr. John, Los Angeles Museum, Exposition Park, Los Angeles, Calif. 1936.
- Cone, Hutchinson I., Jr., 1215 Barnett Bldg., Jacksonville, Fla. 1940.
- Connick, Florence R. (Mrs. A. E.), 18 Tanglewood Road, Berkeley, Calif. 1936.
- Conover, H. B., 6 Scott St., Chicago Ill. 1924 (1924). [L.]
- Conway, Raymond F., Box 1026, Grass Valley, Calif. 1939.
- Cook, Miss Inez, P. O. Box 203, Glendora, Calif. 1924.
- Cook, Kenneth, 308 N. 3rd St., Douglas, Wyo. 1940.
- Cooke, Miss May T., Apt. 401, 1400 Fairmont St., N. W., Washington, D. C. 1918.
- Cooper, James S., 310 Howard Ave., Piedmont, Calif. 1903.
- Cottam, Clarence, U. S. Biological Survey, Washington, D. C. 1926.
- Coursen, G. Blair, 761 East 69th Place, Chicago, Ill. 1929.
- Courtright, Mrs. Mary L., 3 Elm Ave., Larkspur, Calif. 1936.
- Covel, Paul F., 3133 Jordan Road, Oakland, Calif. 1935.
- Cowan, Dr. Ian McTaggart, Provincial Museum, Victoria, B. C., Canada. 1937.
- Cowles, Dr. Raymond B., Univ. Calif. at Los Angeles, Los Angeles, Calif. 1928.
- Crawford, Franklin Goodrich, 1270 E. 37th St., Long Beach, Calif. 1939.
- Crockett, Harry L., 76 Columbus Ave., Phoenix, Ariz. 1924.
- Crook, Compton, State Teachers College, Towson, Maryland. 1937.
- Crouch, James E., San Diego State College, San Diego, Calif. 1934.
- Culbertson, A. E., Fresno State College, Fresno, Calif. 1937.
- Culver, George B., Room 170 Admin. Bldg., Stanford University, Calif. 1921.
- Currier, Ed. S., 8541 N. Chicago Ave., St. Johns Sta., Portland, Ore. 1904.
- Curtis, Miss Elizabeth L., 5648 Beach Drive, Seattle, Wash. 1933.
- Cushing, John Eldridge, Jr., Dept. of Genetics, California Institute of Technology, Pasadena, Calif. 1934.
- Cushman, Lester H., So. Calif. Jr. College, Arlington, Calif. 1934.

## D

- Dale, Frederick H., State Department of Conservation, Lansing, Mich. 1937.
- Danby, Durward E., R. 3, Box 502, Santa Cruz, Calif. 1927.
- Danforth, Charles G., 428½ N. Riverside Dr., Iowa City, Iowa. 1936.
- Darling, Jay N., Box 957, Des Moines, Iowa, 1934.
- Davidson, Mrs. Phyllis, 515 Lytton Ave., Palo Alto, Calif. 1939.
- Davis, David Edward, 721 Elmwood Ave., Wilmette, Ill. 1936.
- Davis, James Randall, 1915 Marin Ave., Berkeley, Calif. 1931.
- Davis, John, Ivanhoe Hotel, 2400 Durant Ave., Berkeley, Calif. 1938.
- Davis, John M., 227 Clark St., Eureka, Calif. 1908.
- Davis, L. Irby, Harlingen, Texas. 1940.
- Davis, Dr. Wm. B., Box 254, Faculty Exchange, College Station, Texas. 1930.
- Day, Ezra R., 3789 S. 52nd West St., Salt Lake City, Utah. 1932.
- Deane, Mrs. Ruthven, 830 Hibbard Road, Winnetka, Ill., 1939 (1939). [L.]
- Dearborn, Dr. Ned, Hilton Village, Virginia. 1909.
- DeGroot, Dudley S., 1151 Minnesota St., San Jose, Calif. 1916.
- Delacour, Jean, Chateau de Clères, Seine Inférieure, France. 1927.
- DeLury, Ralph E., Dominion Observatory, Ottawa, Ontario, Canada. 1926.
- DeMay, Ida S., 8475 Elizabeth Ave., South Gate, Calif. 1939.

- DeMay, Mrs. Maybelle E., 248 E. Chapman St., Fullerton, Calif. 1938.
- Denny, Judge Thomas C., Sonoma, Calif. 1924.
- DeTracy, Herbert Pierre, Bradley, Calif. 1936.
- Deuprey, Mrs. Clifton Swisher, 1419 Solano Ave., Albany, Calif. 1935.
- Dexter, B. D., 2519 Ashby Ave., Berkeley, Calif. 1928.
- Dickey, Florence V. V. (Mrs. Donald R.), Twin Oaks Ranch, Ojai, Calif. 1923.
- Dille, Fred M., 822 Grand Ave., Nogales, Ariz. 1903.
- Dixon, James B., Rt. 1, Box 688, Escondido, Calif. 1924.
- Dixon, Joseph S., 1735 Allston Way, Berkeley, Calif. 1904.
- Dixon, Ralph E., Star Route, Escondido, Calif. 1935.
- Dodge, Ernest Stanley, Peabody Museum, Salem, Mass. 1936.
- Dodge, Thomas Henry, Navajo Agency, Fort Defiance, Arizona. 1936.
- Dodson, Mrs. Leigh M., 1046 S. Holt Ave., Los Angeles, Calif. 1929.
- Dow, Jay Sylvester, 511 Iris St., Redwood City, Calif. 1939.
- Draper, Jerome Chester, Jr., Tudor Drive, Menlo Park, Calif. 1939.
- Driver, E. Raymond, P. O. Box 1114, Medford, Ore. 1940.
- DuBois, Alexander Dawes, R. 2, Christmas Lake Road, Excelsior, Minn. 1911.
- Du Bois, H. M., Rt. No. 1, Box 209A, Clackamas, Oregon. 1931.
- Duff, C. V., 1922 Tamarind Ave., Hollywood, Calif. 1939.
- Duffield, Mrs. J. W., care Forest Experiment Sta., 335 Prospect St., New Haven, Conn. 1937.
- DuMont, Philip A., 405 North Cleveland St., Arlington, Va. 1932.
- Durham, Floyd E., 2593 Life Sciences Bldg., Univ. of Calif., Berkeley, Calif. 1940.
- E
- Edge, Mrs. Charles Noel, 1200 Fifth Ave., New York, N. Y. 1932.
- Edge, Chester W., R. 3, Box 21, Healdsburg, Calif. 1930.
- Edge, Elton R., San Bernardino Valley Junior College, San Bernardino, Calif. 1932.
- Edson, J. M., 2210 Victor St., Bellingham, Wash. 1911.
- Edwards, Myrtle S. (Mrs. Harlan), 225 E. 11th St., Claremont, Calif. 1924.
- Eggleston, J. W., Junior College, Riverside, Calif. 1913 (1919). [L.]
- Ehmann, E. W., 37 Bellevue Ave., Piedmont, Calif. 1931.
- Einarsen, Arthur Skogman, Poultry Bldg., Corvallis, Oregon. 1936.
- Einarsson, Anna R. (Mrs. S.), 699 Santa Barbara Road, Berkeley, Calif. 1934.
- Ellis, Ralph, 2420 Ridge Road, Berkeley, Calif. 1923 (1926). [L.]
- Elmore, Louis A., 2022 Yolo Ave., Berkeley, Calif. 1935.
- Emerson, Guy, 9 Washington Mews, New York, N. Y. 1936.
- Emerson, W. Otto, Palm Cottage, Hayward, Calif. 1901 (1921). [L.]
- Emilio, S. Gilbert, 7 Winter St., Salem, Mass. 1926.
- Emlen, John T., Jr., College of Agriculture, Davis, Calif. 1930.
- Erickson, Dr. Mary M., Santa Barbara State College, Santa Barbara, Calif. 1930.
- Errington, Paul Lester, Insectary, Iowa State College, Ames, Iowa. 1932.
- Evins, Samuel Nesbitt, 188 14th St., N. E., Atlanta, Ga. 1929.
- Ewan, Joseph Andorfer, Dept. of Biology, Univ. of Colo., Boulder, Colo. 1937.
- Eyerdam, Walter J., 7351 19th St., N. E., Seattle, Wash. 1936.
- F
- Failing, Robert, 518 66th St., Oakland, Calif. 1933.
- Failla, Janet, Museum of Vertebrate Zoology, Berkeley, Calif. 1940.
- Fanning, Frank D., P. O. Box 32, Safford, Ariz. 1939.
- Fargo, William G., 506 Union St., Jackson, Mich. 1928.
- Farley, Frank L., Camrose, Alberta, Canada. 1923.
- Feltes, Charles H., 216 Ruberto St., Modesto, Calif. 1935.
- Ferris, Reed W., Beaver, Oregon. 1931.
- Field, Clyde L., 2534 K Ave., National City, Calif. 1919.
- Figgins, J. D., The Britling, Lexington, Ky. 1925.
- Finley, William L., R. F. D. No. 10, Box 426A, Portland, Oregon. 1900.
- Fisher, Dr. A. K., Room 77, U. S. National Museum, Washington, D. C. 1904 (1924) [Honorary].
- Fisher, Miss Edna M., 2410 Fulton St., Berkeley, Calif. 1923.
- Fisher, Harvey Irvin, Dept. of Zoology, Univ. of Calif., Berkeley, Calif. 1939.
- Fisher, Prof. Walter K., Hopkins Marine Sta., Pacific Grove, Calif. 1900.
- Fitch, Dr. Henry Sheldon, U. S. Biological Survey, San Joaquin Experimental Range, O'Neals, Calif. 1933.
- Fleming, Charles B., Jr., Box 163, Tempe, Ariz. 1940.
- Fleming, J. H., 267 Rusholme Road, Toronto, 4, Ontario, Canada. 1910.

- Floyd, Joseph L., Court House, Canton, Ohio. 1940.
- Flynn, Miss Helen, 1094 Keith Ave., Berkeley, Calif. 1920.
- Follett, W. I., 3501 Broadway, Oakland, Calif. 1926.
- Forester, Robert, 1803 S. Hobart Blvd., Los Angeles, Calif. 1938.
- Fossler, Mary L., 550 N. Los Robles Ave., Pasadena, Calif. 1935.
- Fowler, Frederick H., Casa Real Apts., 360 Forest Ave., Palo Alto, Calif. 1901.
- Frames, Mrs. Donald C., 1730 Middlefield Road, Palo Alto, Calif. 1934.
- Frazier, J. F., 724 Proctor Place, Independence, Mo. 1930.
- Fretwell, C. L., Elmhurst Apts., Ogden, Utah. 1936.
- Friedmann, Dr. Herbert, Div. Birds, U. S. National Museum, Washington, D. C. 1927.
- Fritz, Esther C. (Mrs. Emanuel), 102 The Up-lands, Berkeley, Calif. 1935.
- Frost, Wilfrid T., Crater Lake National Park, Fort Klamath, Ore. 1931.
- Furniss, Owen Cecil, 2203 1st Ave. West, Prince Albert, Sask., Canada, 1936.

## G

- Gabrielson, Ira N., Bureau of Biological Survey, Washington, D. C. 1919.
- Gaines, Mrs. George S., P. O. Box 184, North Bend, Wash. 1940.
- Gallup, Frederick Norman, 142 W. 6th Ave., Escondido, Calif. 1921.
- Ganier, Albert F., 2112 Woodlawn Drive, Nashville, Tenn. 1939.
- Garber, Miss Lida J., 15 Tanglewood Road, Berkeley, Calif. 1923.
- Gardiner, Miss Elizabeth M., 1227 Paseo del Mar, San Pedro, Calif. 1936.
- Gardner, Dr. Leon L., 1815 Kilbourne Place, N. W., Washington, D. C. 1911-1916, 1926.
- Garrison, David L., 121 Highland St., West Newton, Mass. 1940.
- Garrity, Devin A., 23 E. 26th St., New York, N. Y. 1940.
- Gault, Benj. T., 413 Hill Ave., Glen Ellyn, Ill. 1905.
- Gausbeck, A. T., 50 Broadway, New York, N. Y. 1924.
- Gay, Harold S., 200 S. Atlantic Blvd., Alhambra Calif. 1901.
- Geiselhart, Miss Josephine, Rt. 2, Box 22A, Concord, Calif. 1920.
- Gensch, Robert H., Division of Wildlife Research, Bureau of Biological Survey, Washington, D. C. 1940.
- Gibb, Andrew Shirra, 2664 Shasta Road, Berkeley, Calif. 1938.
- Gibson, John Herbert, 1027 Merced St., Berkeley, Calif. 1936.
- Gifford, Dr. Harold, 1620 Medical Arts Bldg., Omaha, Nebr. 1916.
- Giles, Vivian, 909 Clay St., Ukiah, Calif. 1934.
- Gilliam, Miss Helen L., 2709 Benvenue Ave., Berkeley, Calif. 1937.
- Gilman, M. French, Banning, Calif. 1901.
- Gladding, Miss Hope Mehleau, 970 Miller Ave., Berkeley, Calif. 1934.
- Glassell, Steve A., 9533 Santa Monica Blvd., Beverly Hills, Calif. 1929.
- Gloyd, Dr. Howard K., Chicago Academy Sciences, 2001 N. Clark St., Chicago, Ill. 1937.
- Goethe, C. M., Capital Nat'l Bank Bldg., Sacramento, Calif. 1938.
- Goelitz, Walter A., 345 Meadow Brook Ave., Ridgewood, N. J. 1915 (1920). [L.]
- Goldman, Edward A., Biological Survey, Washington, D. C. 1901.
- Goldman, Luther, 1092 Keith Ave., Berkeley, Calif. 1937.
- Goolden, Mrs. Elizabeth Burwell, 5611 Carlton Way, Los Angeles, Calif. 1940.
- Gordon, Kenneth L., Dept. Zool., State Agricultural College, Corvallis, Oregon, 1927.
- Gorsuch, D. M., Regional Office, U. S. Forest Service, Albuquerque, New Mexico. 1939.
- Graham, Hatch, 503 Hall of Justice, Los Angeles, Calif. 1937.
- Graham, J. Duncan, Box 27, Benicia, Calif. 1937.
- Grater, Russell K., 6 Leonard St., West Haven, Conn. 1938.
- Gregory, Stephen S., Jr., Box N, Winnetka, Ill. 1924.
- Greenhalgh, Clifton M., 1230 E. 1st South, Salt Lake City, Utah. 1939.
- Grimes, Samuel A., Rt. No. 5, Box 284F, Jacksonville, Florida. 1924.
- Grinnell, Hilda Wood (Mrs. Joseph), 2737 Forest Ave., Berkeley, Calif. 1912 (1921). [L.]
- Griscom, Ludlow, Museum of Comparative Zoology, Cambridge, Mass. 1933.
- Groody, Thomas Conrad, Museum of Vertebrate Zoology, Berkeley, Calif. 1940.
- Gross, Prof. Alfred O., 11 Boody St., Brunswick, Maine. 1923.
- Guggolz, Jack, 2521 Dwight Way, Berkeley, Calif. 1940.
- Guion, George Seth, 1716 American Bank Bldg., New Orleans, La. 1911.

## H

- Hachisuka, The Marquess, Mita Shiba, Tokyo, Japan. 1928.
- Hackley, Mrs. Sadie Gilmore, 807 Waverly St., Palo Alto, Calif. 1934.
- Haecker, Frederick W., 506 South 52nd St., Omaha, Nebr. 1940.

- Hadsall, Dr. Leo F., Fresno State College, Fresno, Calif. 1937.
- Haefner, Miss Emma, 2420 S. Atherton St., Berkeley, Calif. 1931.
- Hager, Miss Elizabeth, 101 S. Vega St., Alhambra, Calif. 1931.
- Hague, Miss Florence S., Dept. Biol., Sweet Briar College, Sweet Briar, Virginia. 1925.
- Haley, Dr. George, P. O. Box 265, Berkeley, Calif. 1925.
- Hall, Edward M., 802 E. 4th St., Whittier, Calif. 1937.
- Hall, Dr. E. Raymond, Museum Vertebrate Zoology, Univ. Calif., Berkeley, Calif. 1924.
- Halladay, Daniel S., 628 E. Chestnut Ave., Santa Ana, Calif. 1910.
- Haller, Karl William, No. 3 Martindill Terrace, Maple Ave., Woodsdale, Wheeling, West Virginia. 1936.
- Halloran, Arthur F., College Station, Texas. 1933.
- Hamlin, John W., 9 Bridge Road, Berkeley, Calif. 1936.
- Hampe, Irving Edward, 3909 Wilkins Ave., Baltimore, Md. 1938.
- Hand, Ralph L., 543 South 5th St., West, Missoula, Mont. 1927.
- Handlan, John Welty, 91 Lynwood Ave., Wheeling, West Virginia. 1935.
- Handley, Charles O., Blackburg, Virginia. 1927.
- Hann, H. H., Otter Rock, Ore. 1909.
- Hanna, Wilson C., 141 East F St., Colton, Calif. 1902 (1921). [L.]
- Hannum, Robert G., 3634 Hughes Ave., Palms, Calif. 1934.
- Hardy, Ross, Dixie College, St. George, Utah. 1938.
- Hargrave, Lyndon L., 113 Olive Rd., Tucson, Ariz. 1931.
- Hargreaves, W. Lawton, 770 Wesley Ave., Oakland, Calif. 1937.
- Harper, Dr. Francis, 224 S. Chester Road, Swarthmore, Pa. 1920.
- Harriot, Samuel C., 200 W. 58th St., New York, N. Y. 1934.
- Harris, Mrs. Charles A., R. No. 1, Box 100, Carmel, Calif. 1930.
- Harris, Harry, 5234 Hermosa Ave., Eagle Rock, Los Angeles, Calif. 1914 (1919). [L.]
- Harrison, Ed. N., Box 324, Encinitas, Calif. 1931.
- Harter, Samuel G., Natural History Museum, Balboa Park, San Diego, Calif. 1927.
- Hartshorne, Dorothy C. (Mrs. Charles), Faculty Exchange, Univ. of Chicago, 5750 Ellis Ave., Chicago, Ill., 1937.
- Hartung, Miss Esther Margaret, 124 Mill St., Grass Valley, Calif. 1923.
- Harvey, Dr. Paul Atwood, 2807 Regent St., Berkeley, Calif. 1938.
- Harwell, Charles Albert, Park Naturalist, Yosemite, Calif. 1925.
- Hatfield, Donald M., Division of Economic Zoology, Univ. of Minn., St. Paul, Minn. 1934.
- Hathaway, Harry S., Riverside and Thorne Aves., South Auburn, Cranston, R. I. 1912.
- Hatton, Mrs. Louise M., Corral de Tierra Route, Monterey, Calif. 1931.
- Havemeyer, Henry O., Mahwah, N. J. 1917.
- Hawbecker, Albert C., 824 Lincoln St., Watsonville, Calif., 1936.
- Hawk, Lucy Bell, 219 N. Calaveras St., Fresno, Calif. 1940.
- Haynke, Carl Frederick, 813 San Carlos Ave., Albany, Calif. 1939.
- Hayward, C. Lynn, Dept. Zoology, Brigham Young University, Provo, Utah. 1938.
- Hazeltine, Karl Snyder, State College, San Jose, Calif. 1936.
- Head, Glen B., 337 Haskins St., Klamath Falls, Oregon. 1936.
- Heaton, Harry Lee, 3753 29th St., San Diego, Calif. 1939.
- Hedges, R. Frank, Box 1348, Soil Conservation Service, Albuquerque, New Mexico. 1939.
- Heineman, O. J., 14 Bay View, Mill Valley, Calif. 1908.
- Helme, Arthur H., 223 Bayview Terrace, Port Jefferson, N. Y. 1911.
- Helmuth, William Tod, 3rd, 667 Madison Ave., New York, N. Y. 1933.
- Hemphill, Donald Vincent, Box 203, Calistoga, Calif. 1937.
- Henderson, Walter C., 8 Magnolia Parkway, Chevy Chase, Md. 1918.
- Henne, Christopher, 3rd, 312 Grand Ave., South Pasadena, Calif. 1929.
- Henry, Wilbur V., Route 1, Box 381, Los Altos, Calif. 1934.
- Hersey, F. Seymour, Easton, Mass. 1915 (1920). [L.]
- Hersey, Merrick Fred, 342 Wilshire St., Upper Darby, Pa. 1937.
- Hicks, Dr. Lawrence E., Ohio Wildlife Research Sta., Ohio State University, Columbus, Ohio. 1936 (1936). [L.]
- Hill, Harold Merrill, 329 Summit Ave., Redlands, Calif. 1935.
- Hilton, Dr. W. A., Pomona College, Claremont, Calif. 1921.
- Hinshaw, Thomas Doane, Museum of Zoology, Univ. of Michigan, Ann Arbor, Mich. 1931.
- Hinton, Sam D., 421 Wing St., Glendale, Calif. 1939.
- Hjersman, Henry Arthur, 178 Vernon Terrace, Oakland, Calif. 1940.
- Hodgkins, Albert E., 347 E. Flora St., Stockton, Calif. 1929.
- Hoffmeister, Donald F., Museum of Vertebrate Zoology, Berkeley, Calif. 1940.
- Holdenreid, Robert, Glenn, Glenn Co., Calif. 1940.



- Holland, Harold M., Box 515, Galesburg, Ill. 1901 (1920). [L.]
- Holman, F. C., Box 115, Carmel, Calif. 1914 (1928). [L.]
- Hood, Mary V., 138 S. Wilton Drive, Los Angeles, Calif. 1940.
- Hooper, Emmet T., Museum of Zoology, Univ. of Mich., Ann Arbor, Mich. 1934.
- Hoover, Mrs. Glenn E., 4488 Reinhardt Drive, Oakland, Calif. 1936.
- Hoover, Prof. Theodore J., Davenport, Santa Cruz Co., Calif. 1898 (1916). [L.]
- Horsfall, R. Bruce, 3835 S St., N. W., Washington, D. C. 1914.
- House, Verl Lee, 2013 Hearst Ave., Berkeley, Calif. 1939.
- Howard, Dr. Hildegard, Los Angeles Museum, Exposition Park, Los Angeles, Calif. 1924.
- Howard, William Johnson, 6721 Strathmore St., Chevy Chase, Md. 1938.
- Howell, A. Brazier, Dept. of Anatomy, Johns Hopkins Medical School, Baltimore, Md. 1908 (1915). [L.]
- Howell, Arthur H., 2919 S. Dakota Ave., Washington, D. C. 1916.
- Howitt, Miss Beatrice Fay, 1341 7th Ave., San Francisco, Calif. 1927.
- Howsley, Lucien B., 1509 9th Ave., Seattle, Wash. 1931.
- Howsley, Lucien R., 611 38th St., San Pedro, Calif. 1927.
- Hubbard, Douglass, 2010 Channing Way, Berkeley, Calif. 1937.
- Huber, Wharton, Academy Natural Sciences, 19th and The Parkway, Philadelphia, Penn. 1915.
- Huey, Laurence M., Natural History Museum, Balboa Park, San Diego, Calif. 1909 (1921). [L.]
- Hughes, George T., Box 153, Plainfield, N. J. 1927.
- Hungate, Prof. J. W., Eastern Washington College of Education, Cheney, Wash. 1924.
- Hunn, John T. S., 1218 Prospect Ave., Plainfield, N. J. 1939.
- Hurd, Paul David, Jr., P. O. Box 533, Costa Mesa, Calif. 1940.
- Hurley, John B., 401 S. 17th St., Yakima, Wash. 1921.
- Hussey, Mrs. Arthur E., 6017 Atlas Place, Seattle, Wash. 1940.
- Hutchinson, Arthur Elberg, 184 S. Main St., Cedar City, Utah. 1940.
- Hutchinson, Magdeleine C., Chester Springs, Chester Co., Pa. 1940.
- Hyde, A. Sidney, Eastern Oregon College of Education, La Grande, Ore. 1939.
- I
- Illg, Paul, Pinole, Calif. 1937.
- Imier, Ralph H., 137 E. 8th Ave., Denver, Colo. 1936.
- Ingersoll, Albert M., 908 F St., San Diego, Calif. 1895 (1932) [Honorary].
- Ingles, Lloyd Glenn, Chico State College, Chico, Calif. 1936.
- Irvine, Milton Boyd, 626 N. Electric Ave., Alhambra, Calif. 1937.
- Isham, C. Bradley, 236 McCosh Road, Upper Montclair, N. J. 1909.
- J
- Jackson, Dr. Hartley H. T., Biological Survey, Washington, D. C. 1921.
- Jacot, Edouard C., Box 462, Prescott, Ariz. 1923.
- Jaeger, Edmund C., 4462 W. 6th St., Riverside, Calif. 1922.
- Jefcoat, Arthur W., care Pacific Gas and Electric Co., Paynes Creek, Calif. 1937.
- Jenkins, Hubert O., 2116 3rd Ave., Sacramento, Calif. 1933.
- Jenks, Randolph, Rancho Esperero, Univ. Sta., Tucson, Ariz. 1931.
- Jerrard, Robert Bruce, Garfield, Colorado. 1927.
- Jewett, Stanley G., 1404 Bidwell St., S. E., Portland, Ore. 1909.
- Johnson, Archibald, Rt. 2, Jamestown, North Dakota. 1934.
- Johnson, David H., Museum Vertebrate Zoology, Berkeley, Calif. 1937.
- Johnson, Elizabeth O., Museum of Vertebrate Zoology, Berkeley, Calif. 1937.
- Johnson, Miss Linnea M., P. O. Box 156, Turlock, Calif. 1936.
- Johnson, Dr. Myrtle E., 4647 55th St., San Diego, Calif. 1908.
- Jones, Berton F., 3406 Adell Court, Oakland, Calif. 1937.
- Jones, John C., Bureau of Game, New York State Conservation Dept., Albany, N. Y., 1940.
- Jones, Dr. Lynds, 352 W. College St., Oberlin, Ohio. 1911.
- Jones, S. Paul, 509 West Ave. North, Waukesha, Wis. 1929.
- Jones, Victor E., Univ. of Idaho, Southern Branch, Pocatello, Idaho. 1938.
- Jordan, A. H. B., Everett, Wash. 1911.
- Jory, Mrs. Stafford L., 1370 Euclid Ave., Berkeley, Calif. 1936.
- K
- Kalmbach, Edwin R., 2654 Forest Ave., Denver, Colorado. 1923.
- Keene, Herman Belden, 14 McKeveht Hts., Santa Paula, Calif. 1937.
- Kellogg, Miss Louise, The Regillus, 19th and Jackson Sts., Oakland, Calif. 1911 (1927). [L.]
- Kellogg, Miss Mildred, 2232 Piedmont Ave., Berkeley, Calif. 1921.
- Kellogg, Ralph T., Silver City, N. M. 1916.
- Kelly, Junea W. (Mrs. G. Earle) 1311 Grand St., Alameda, Calif. 1918.



- McClintock, Edwin H., 2448 Monticello Ave., Oakland, Calif. 1936.
- McCoskey, Dr. Grace, P. O. Box 1170, Stockton, Calif. 1936.
- McCoy, Frank J., El Encanto Hotel, Santa Barbara, Calif. 1932.
- McCoy, Herbert N., 1226 Westchester Place, Los Angeles, Calif. 1928. [L.]
- McCracken, Dr. Isabel, Box 1545, Stanford University, Calif. 1933.
- McCreary, Otto, Agricultural Hall, Univ. Wyo., Laramie, Wyoming. 1928.
- McDonald, Floyd A., P. O. Box 283, Vista, Calif. 1936.
- McDonald, Mrs. James R., P. O. Box 494, Laurel Ave., Ross, Marin Co., Calif. 1927 (1927). [L.]
- McGettigan, C. Carroll, 2644 Filbert St., San Francisco, Calif. 1940.
- McGuire, Ignatius, 209 Guyot Hall, Princeton Univ., Princeton, N. J. 1929.
- McIlhenny, Edward Avery, Avery Island, La. 1934.
- McKnight, Edwin Thor, 5038 Park Place, Friendship Sta., Washington, D. C. 1936.
- McLain, Donald, 2780 Rose Ave., Altadena, Calif. 1930-33, 1939.
- McLain, Robert B., Box 132, Hollywood, Calif. 1897.
- McLaughlin, Donald T., Yerba Buena Island, San Francisco, Calif. 1930.
- McLean, Donald D., 101 E. St. James St., San Jose, Calif. 1916.
- McLeod, Boyd, New Mexico Military Academy, Roswell, New Mexico. 1937.
- McManus, William Reid, Memramcook, New Brunswick, Canada. 1931.
- M
- Macnab, Prof. James A., Linfield College, McMinnville, Ore. 1935.
- Macneil, Sayre, 1004 Edison Bldg., 601 W. 5th St., Los Angeles, Calif. 1934.
- Mailliard, Ernest C., Federal Reserve Bank, San Francisco, Calif. 1909.
- Mailliard, Joseph, 1815 Vallejo St., San Francisco, Calif. 1895 (1920). [L.] (1924) [Honorary].
- Maresi, Pompeo M., 9 Reimer Road, Scarsdale, N. Y. 1940.
- Marsh, Vernon L., Botany Dept. Univ. of Wash., Seattle, Wash. 1933.
- Marshall, Dr. Arthur P., 778 Higuera St., San Luis Obispo, Calif. 1932.
- Marshall, Joe T., Jr., Museum of Vertebrate Zoology, Berkeley, Calif. 1936.
- Marshall, William H., Box 1998, Boise, Idaho. 1937.
- Martin, E. Whitney, 525 Lincoln Ave., Palo Alto, Calif. 1937.
- Martin, Patrick W., View Royal, R. R. 1, Victoria, B. C., Canada. 1931.
- Mason, Dr. Herbert L., 1190 Sterling Ave., Berkeley, Calif. 1927.
- Massey, Herbert, Ivy Lea, Burnage Lane, Manchester 19, England. 1909.
- Maxfield, Mrs. Jack, 72 Inverleith Terrace, Piedmont, Calif. 1939.
- Mayr, Dr. Ernst, American Museum of Natural History, New York, N. Y. 1933.
- Meadows, Donald C., 640 Terraine Ave., Long Beach, Calif. 1919.
- Meredith, George S., Farmers and Merchants Savings Bank, Oakland, Calif. 1927.
- Merriam, Dr. C. Hart, 2590 Cedar St., Berkeley, Calif. (1909) [Honorary].
- Mershon, W. B., Saginaw, Mich. 1911 (1919). [L.]
- Michael, Chas. W., 637 Winona Ave., Pasadena, Calif. 1916.
- Michener, Harold, 418 N. Hudson Ave., Pasadena, Calif. 1924.
- Michener, Josephine R., 418 N. Hudson Ave., Pasadena, Calif. 1934.
- Miller, Dr. Alden Holmes, Museum Vertebrate Zoology, Univ. Calif., Berkeley, Calif. 1923.
- Miller, Edwin Vance, Box 27, Scotia, Calif. 1939.
- Miller, John L., 2349 West 23rd St., Los Angeles, Calif. 1940.
- Miller, Prof. Loye Holmes, Univ. Calif. at Los Angeles, Los Angeles, Calif. 1905 (1936) [Honorary].
- Miller, Malcolm Ray, Univ. Calif. at Los Angeles, Los Angeles, Calif. 1940.
- Miller, Miss Mary Mann, 5928 Hayes Ave., Highland Park, Los Angeles, Calif. 1920.
- Miller, Dr. Robert C., California Academy of Sciences, Golden Gate Park, San Francisco, Calif. 1921.
- Miller, William Thomas, 1809 Bushnell Ave., South Pasadena, Calif. 1937.
- Mitchell, Dr. Walton I., 398 Vassar Ave., Berkeley, Calif. 1909.
- Moeller, B. A., 2525 E. 37th St., Los Angeles, Calif. 1935.
- Moeran, Edward H., 541 Bronx River Road, Yonkers, N. Y. 1940.
- Moffitt, James, 1879 Broadway, San Francisco, Calif. 1917.
- Moll, Miss Leno, 3601 Trinity St., Eureka, Calif. 1937.
- Monk, Harry C., 3108 Long Blvd., Nashville, Tenn. 1925.
- Monson, Gale, 1410 East Helen St., Tucson, Ariz. 1936.
- Moore, Robert T., R. D. No. 1, Box 28A, Pasadena, Calif. 1911.
- Moore, Walter, 319 Newton Ave., Oakland, Calif. 1937.
- Moos, Louis M., Soil Conservation Service, Billings, Mont. 1938.

Moose, Rosa Lee, 3170 Valencia Drive, San Bernardino, Calif. 1937.  
 Moran, R. B., 215 W. 7th St., Los Angeles, Calif. 1897.  
 More, R. L., 1905 Wilbarger St., Vernon, Texas. 1911.  
 Morley, Prof. S. Griswold, 2635 Etna St., Berkeley, Calif. 1916.  
 Moser, Dr. R. Allyn, Suite 612, 1504 Dodge St., Omaha, Neb. 1940.  
 Mowbray, Vincent, 5052 Fairfax Ave., Oakland, Calif. 1937.  
 Mulford, Miss Alice Stewart, 1637 Spruce St., Berkeley, Calif. 1933.  
 Munro, J. A., Okanagan Landing, B. C., Canada. 1914.  
 Murdock, James, care Sunset McKee Salesbook Co., 900 Allen Ave., Glendale, Calif. 1938.  
 Murie, Adolph, Jackson, Wyo. 1935.  
 Murie, Olaus J., Jackson, Wyoming. 1913.  
 Murray, J. Laurence, P. O. Box 311, Compton, Calif. 1939.  
 Myers, Mrs. Harriet W., 311 N. Ave. 66, Los Angeles, Calif. 1912.  
 Myers, Miss Mabel Adelaide, 617 W. Center St., Anaheim, Calif. 1922.

## N

Nace, Charles A., P. O. Box 148, Capitola, Calif. 1920 (1920). [L.]  
 Nash, Herman W., Box 1224, Pueblo, Colo. 1922.  
 Naumburg, Mrs. Walter W., American Museum Natural History, New York, N. Y. 1922.  
 Neff, Johnson A., U. S. Biological Survey, P. O. Box 1317, Sacramento, Calif. 1920.  
 Neff, Mitchell Tabb, Kentfield, Marin Co., Calif. 1939.  
 Nelson, Arnold L., U. S. Biological Survey, Washington, D. C. 1932.  
 Nelson, Mrs. Jean M., 1729 Spruce St., Berkeley, Calif. 1929.  
 Nelson, Roy A., 5450 14th Ave., Sacramento, Calif. 1925.  
 Nelson, Theodore, 2695 Heath Ave., New York, N. Y. 1940.  
 Nice, Mrs. Margaret M., 5708 Kenwood Ave., Chicago, Ill. 1921.  
 Nichols, Charles K., 212 Hamilton Road, Ridge-wood, N. J. 1936.  
 Nichols, David Gelston, 1713 Dwight Way, Berkeley, Calif. 1939.  
 Nichols, John T., American Museum Nat. Hist., New York, N. Y. 1909.  
 Nichols, Mrs. Mary Jane, Rt. 2, Box 194, Tucson, Ariz., 1939.  
 Nichols, Walter F., 120 S. San Rafael Ave., Pasadena, Calif. 1938.  
 Nicholson, Donald J., 1218 Greenwood Ave., Orlando, Fla. 1911.

Nickelsen, Dr. H. C., 920 S. Broadway, Tacoma, Wash. 1935.  
 Noack, Harry R., 309 Perry St., Oakland, Calif. 1901.  
 Nokes, Dr. I. D., 1120 Rives-Strong Bldg., Los Angeles, Calif. 1914.  
 Nold, Jane, 83 Castro St., San Leandro, Calif. 1938.  
 Nordyke, Almeda, 2745 C St., Selma, Calif. 1940.  
 North, Chandler P., 1687 Le Roy Ave., Berkeley, Calif. 1937.  
 Norton, Arthur H., 22 Elm St., Portland, Maine. 1918.

## O

Oberholser, Dr. Harry C., 2805 18th St., N. W., Washington, D. C. 1904.  
 Oberlander, George T., 401 41st Ave., San Francisco, Calif. 1938.  
 O'Melveny, Stuart, 1233 Garfield Ave., South Pasadena, Calif. 1931.  
 Ordway, Miss Elizabeth Irving, 730 Mayflower Road, Claremont, Calif. 1939.  
 Orr, Dr. Robert T., 1842 Santiago St., San Francisco, Calif. 1931.  
 Osgood, Dr. Wilfred H., Field Museum Nat. Hist., Chicago, Ill. 1893 (1927). [L.]  
 Owen, Virgil W., 2617 Blimp St., Sta. E, Los Angeles, Calif. 1896.  
 Owre, Oscar, Jr., 2625 Newton Ave. South, Minneapolis, Minn. 1937.

## P

Painton, Dr. Harry R., 1000 Cowper St., Palo Alto, Calif. 1893-97, 1936.  
 Palmer, Miss Elizabeth Day, 1741 S. Harvard Blvd., Los Angeles, Calif. 1909.  
 Palmer, Dr. R. H., Neptuno 1060, Havana, Cuba. 1915.  
 Palmer, Dr. Theodore S., 1939 Biltmore St., N. W., Washington, D. C. 1903 (1920). [L.] (1929) [Honorary].  
 Paquette, Elmer, care M. C. Badger, Santa Paula, Calif. 1938.  
 Parker, Clarence J., 821 N. Garfield Ave., Alhambra, Calif. 1938.  
 Parker, Edgar J., 1924 Onyx St., Eugene, Ore., 1932.  
 Parmenter, Henry E., 1808 Vallejo St., San Francisco, Calif. 1916.  
 Partin, J. L., 2151 Balsam Ave., Los Angeles, Calif. 1930.  
 Patrick, Dr. Leon, Smith-Grote Bldg., Orange, Calif. 1931.  
 Patterson, Mrs. Theresa Homet, 544 S. El Molino Ave., Pasadena, Calif. 1926 (1926) [L.]  
 Paul, Lucius H., 424 Carter St., Rochester, N. Y. 1911.  
 Payne, Ernest A., 836 West I Street, Ontario, Calif. 1934.







- Silliman, O. P., 225 West Alisal St., Salinas, Calif. 1893 (1937). [L.]
- Sims, Mrs. R. M., 36 Hillcrest Road, Berkeley, Calif. 1933.
- Skillen, Donald R., Rt. 1, Box 65, Pasadena, Calif. 1927.
- Skinner, M. P., 306 East 4th St., Long Beach, Calif. 1915 (1920). [L.]
- Sloanaker, Jos. L., 1117 Maxwell Ave., Spokane, Washington, 1910.
- Smart, Keith L., Box 206, Indio, Calif. 1939.
- Smiley, Dwight C., Box 261, Grand Canyon, Ariz. 1936.
- Smith, Allyn G., 722 Santa Barbara Road, Berkeley, Calif. 1909.
- Smith, Anna Margaret (Mrs. Otis H.), 59 Elm Ave., San Anselmo, Calif. 1934.
- Smith, Austin P., Zarcero, Costa Rica. 1907.
- Smith, Clarence F., U. S. Biological Survey, Washington, D. C. 1928.
- Smith, Mrs. Elizabeth Burnell, 1035 N. Stanley Ave., Cole Branch, Los Angeles, Calif. 1921.
- Smith, Miss Emily, Route 1, Box 93, Los Gatos, Calif. 1924.
- Smith, Horace G., 2918 Lafayette St., Denver, Colo. 1914.
- Smith, Miss Josephine E., 51 Canyon Road, Berkeley, Calif. 1928.
- Smith, Loris Philbrick, 2017 108th Ave., Oakland, Calif. 1930.
- Smith, Napier, care Bank of Montreal, 9 Waterloo Place, Pall Mall, London, S. W. 1, England. 1919.
- Smith, Miss Natasha D., 2203 Piedmont Ave., Berkeley, Calif. 1937.
- Smith, Ronald Ward, Dept. of Biology, Queens University, Kingston, Ontario, Canada. 1939.
- Smith, Miss Winifred M., 46 Nace Ave., Piedmont, Calif. 1939.
- Snell, Charles H., Box 101, Red Deer, Alberta, Canada. 1926.
- Snyder, Prof. J. O., 542 Alvarado Row, Stanford University, Calif. 1900.
- Snyder, L. L., Royal Ontario Museum of Zoology, Toronto, Ont., Canada. 1924.
- Soper, J. Dewey, 827 Riverwood Ave., Fort Garry, Winnipeg, Manitoba, Canada. 1937.
- Spaulding, Prof. M. Herrick, State Agricultural College, Bozeman, Mont. 1918.
- Sprague, Elizabeth F., Fullerton Union High School, Fullerton, Calif. 1940.
- Sprinkle, Charles R., 338 3rd St., Havre, Montana. 1936.
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- Stacey, John W., 236 Flood Bldg., San Francisco, Calif. 1940.
- Stager, Kenneth E., 4300 Budlong Ave., Los Angeles, Calif. 1935.
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- Stebbins, Robert Cyril, 14647 Valley Vista Blvd., Van Nuys, Calif. 1939.
- Stedman, Miss Clara M., 3871 Howe St., Oakland, Calif. 1929.
- Steele, Ed. S., Box 341, North San Diego, Calif. 1926.
- Stephens, Mrs. Albert Blasdel, 1695 Filbert St., San Francisco, Calif. 1934.
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- Stephens, Prof. T. C. Morningside College, Sioux City, Iowa. 1914.
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